TM 11-5820-393-35

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

See C1

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FIELD AND DEPOT MAINTENANCE MANUAL

RECEIVER, RADIO R-853/URR

HEADQUARTERS, DEPARTMENT OF THE ARMY

25 JANUARY 1961

WARNING

DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT

Be careful when servicing the receiver as 220 volts may be present between chassis and ground. Before performing maintenance, measure the voltage between chassis and bench ground. If any voltage is indicated, reverse the line cord plug.

DON'T TAKE CHANCES!

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TM 11–5820–393–12

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR'S AND ORGANIZATIONAL MAINTENANCE MANUAL, RECEIVER, RADIO R–853/URR

Headquarters, Department of the Army, Washington 25, D. C.
26 August 1960

See C 3

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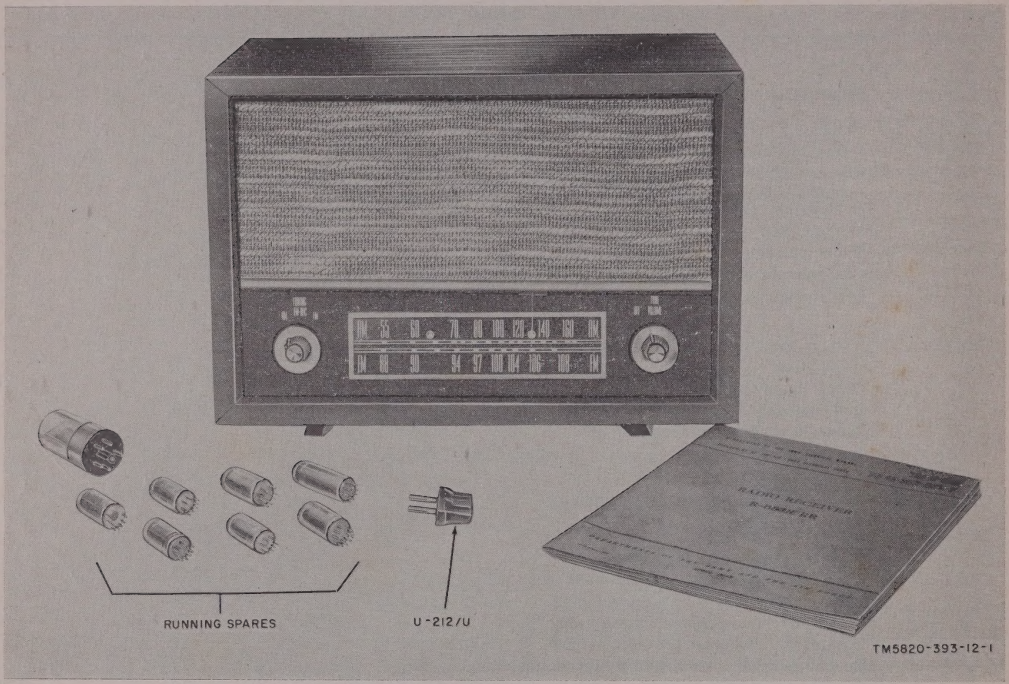

Figure 1. Receiver, Radio R-853/URR.

3/11/70 p.p.

Change now in effect: C 3

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TECHNICAL MANUAL

Operator's and Organizational Maintenance Manual
RECEIVER, RADIO R–853/URR

TM 11–5820–393–12
CHANGES No. 3

HEADQUARTERS,
DEPARTMENT OF THE ARMY,
WASHINGTON, D.C., *3 September 1963*

TM 11–5820–393–12, 26 August 1960, is changed as follows:

Page 3. Add paragraph 1.1 after paragraph 1.

1.1. Index of Publications

Refer to the latest issue of DA Pam 310–4 to determine whether there are new editions, changes, or additional publications pertaining to this equipment. DA Pam 310–4 is a current index of technical manuals, technical bulletins, supply bulletins, lubrication orders, and modification work orders that are available through publications supply channels. The index lists the individual parts (–10, –20, –35P, etc.) and the latest changes and revisions of each equipment publication.

Paragraph 2. (As changed by C 2, 12 Oct 61) Delete and substitute:

2. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance with instructions in TM 38–750.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700–58 (Army), NAVSANDA Publication 378 (Navy), and AFR 71–4 (Air Force).

c. Reporting of Equipment Manual Improvements. The direct reporting by the individual user of errors, omissions, and recommendations for improving this manual is authorized and encouraged. DA Form 2028 (Recommended Changes in DA Technical Manual Parts Lists or Supply Manual 7, 8, or 9) will be used for reporting these improvements. This form will be completed in triplicate using pencil, pen, or typewriter. The original and one copy will be forwarded direct to: Commanding Officer, U. S. Army Electronics Materiel Support Agency, ATTN: SELMS–MP, Fort Monmouth, N. J. One information copy will be furnished to the individual's immediate supervisor (e.g., officer, noncommissioned officer, supervisor, etc.)

Page 5. Delete paragraph 8 and substitute:

8. Checking Unpacked Equipment

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6 (par. 2).

b. See that the equipment is complete as listed on the packing slip. If a packing slip is not available, check the equipment against the basic issue items list (app. III). Report all discrepancies in accordance with TM 38–750. Shortage of a minor assembly or part that does not affect proper functioning of the equipment should not prevent use of the equipment.

c. If the equipment has been used or reconditioned, see whether it has been changed by a modification work order (MWO). If the equipment has been modified, the MWO

*This change supersedes C 2, 12 October 1961.

number will appear on the front panel near the nomenclature plate. Check to see whether the MWO number (if any) and appropriate notations concerning the modification have been entered in the equipment manual.

Note. Current MWO's applicable to the equipment are listed in DA Pam 310–4.

Page 8, paragraph 11. Delete subparagraph *b* and substitute:

b. FM-AFC Operation. Set the AM FM–AFC FM switch to FM. Turn the receiver on and allow it to warm up for a few minutes. Tune-in the desired station. Set the AM—FM–AFC—FM switch to FM–AFC. Set the VOLUME control to the desired sound level. Adjust the TONE control for the desired tonal response. The receiver will stay tuned to the station.

Page 9. Delete paragraph 13 and substitute:

13. Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.

a. Systematic Care. The procedures given in paragraphs 13.2 and 13.3 cover routine systematic care and cleaning essential to proper upkeep and operation of the equipment.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services chart (par. 13.2) outlines functions to be performed at specific intervals. These checks and services are to maintain Army electronic equipment in a combat serviceable condition; that is, in good general (physical) condition and in good operating condition. To assist operators in maintaining combat serviceability, the chart indicates what to check, how to check, and what the normal conditions are. The *references* column lists the illustrations, paragraphs, or manuals that contain supplementary information. If the defect cannot be remedied by the operator, higher echelon maintenance or repair is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38–750.

Add paragraph 13.1, 13.2, and 13.3 after paragraph 13:

13.1. Preventive Maintenance Checks and Services Periods

Preventive maintenance checks and services of the R–853/URR are required on a daily basis. Paragraph 13.2 specifies checks and services that must be accomplished daily and under the special conditions listed below.

a. When the equipment is initially installed.

b. When the equipment is reinstalled after removal for any reason.

c. At least once each week if the equipment is maintained in standby condition.

13.2. Daily Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Exterior surface	Clean the exterior surface of the receiver.	Fig. 1 and par. 13.3.
2	Dial window	Check the dial window glass for cracks or looseness.	Fig. 1.
3	Completeness	Check the receiver for completeness.	App III.
4	Antenna	Check the fm antenna for damage.	None.
5	Knobs, dial, and switches.	Observe that the mechanical action of each knob, dial, and switch is smooth and free of external or internal binding. Make this observation while performing (Item 6) the receiver performance check.	None.
6	Receiver performance	*a.* Check the operation of the receiver by performing the steps given in the equipment performance checklist.	*a.* Par. 18*b*.
		b. Check the phonograph operation, using a phonograph record player with a crystal or ceramic pickup, if available.	*b.* Par. 11*d*.

13.3. Cleaning

Inspect the exterior of the receiver. The exterior surfaces should be clean, and free of dust, dirt, grease, and fungus.

a. Remove dust and loose dirt with a clean soft cloth.

Warning: **Cleaning compound (FSN 7930–395–9542) is flammable and its fumes are toxic. Provide adequate ventilation. *Do not* use near a flame.**

b. Remove grease, and ground-in dirt from the case; use a cloth dampened (not wet) with cleaning compound.

c. Remove dust or dirt from the power cord and the antenna lead-in with a brush.

d. Clean the front panel, and control knobs; use a soft clean cloth. If dirt is difficult to remove, dampen the cloth with water; use mild soap if necessary.

Delete paragraph 17 and substitute:

17. Quarterly Maintenance

a. Quarterly preventive maintenance checks and services on R–853/URR are required. Daily services constitute a part of the quarterly preventive maintenance checks and services and must be performed concurrently. All deficiencies or shortcomings will be recorded in accordance with the requirements of TM 38–750. Perform all the checks and services listed in the quarterly preventive maintenance checks and services chart (par. 17.1) in the sequence listed.

b. Clean rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on sanded metal or wood areas to protect them from corrosion or deterioration. Refer to applicable cleaning and refinishing practices specified in TM 9–213.

Add paragraph 17.1 after paragraph 17.

17.1. Quarterly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Installation	See that the receiver is properly installed.	Par. 9.
2	Preservation	Check all surfaces for evidence of fungus. Remove rust and corrosion and spot-paint bare spots.	Par. 17*b*.
3	Publications	See that all publications are complete, serviceable, and current.	DA Pam 310–4.
4	Modifications	Check DA Pam 310–4 to determine if new applicable MWO's have been published. All urgent MWO's must be applied immediately. All routine MWO's must be scheduled.	TM 38–750 and DA Pam 310–4.
5	Pluckout items	Inspect seating of pluckout items. Check for incorrect, bent, or broken parts.	Fig. 8.
6	Fixed capacitors	Check the fixed capacitors for bulges or leaks.	None.
7	Resistors and insulators.	Check for charred resistors and for broken or cracked insulators.	None.
8	Transformer	Check the output transformer for evidence of overheating or vibrating laminations.	None.
9	Antenna	Check the am. antenna for dust, dirt or corrosion. Verify that the FM antenna is suitable, and check for corrosion.	None.
10	Inside of cabinet	Check the inside of the cabinet when the chassis is removed. Remove dust and dirt.	None.
11	Spare parts	Check all spare parts (operator and organizational) for general condition and method of storage. There should be no evidence of overstock, and all shortages must be on valid requisitions.	Appx III.

Pages 11 and 12. Delete figures 6 and 7.

Page 15. Delete appendix I and substitute:

APPENDIX I

REFERENCES

Following is a list of references available to the operator and organizational repairman of the R–853/URR.

DA Pam 310–4	Index of Technical Manuals, Technical Bulletins Supply Bulletins, Lubrication Orders, and Modification Work Orders.
SM 11–4–5180–R09	Radio Repair Tool Kit, TK–115/G.
TM 9–213	Painting Instructions for Field Use.
TM 11–6625–274–12	Operator's and Organizational Maintenance Manual: Test Sets Electron Tube TV–7/U, TV–7A/U, TV–7B/U, and TV–7D/U.
TM 38–750	The Army Equipment Record System and Procedures.

Delete appendix II (As added by C 2, 12 Oct 61) (Page 1 of C 1), and substitute the following:

APPENDIX II

MAINTENANCE ALLOCATION CHART RECEIVER, RADIO R–853/URR

1. General

a. This appendix assigns maintenance functions to be performed on components, assemblies, and subassemblies by the lowest appropriate maintenance echelon.

b. Columns in the maintenance allocation chart are as follows:

(1) *Component.* This column shows only the nomenclature or standard item name. Additional descriptive data is included only where clarification is necessary to identify the component.

(2) *Maintenance function.* This column indicates the various maintenance functions allocated to the echelons.

(*a*) *Service.* To clean, to preserve, and to replenish lubricants.

(*b*) *Adjust.* To regulate periodically to prevent malfunction.

(*c*) *Inspect.* To verify serviceability and to detect incipient electrical or mechanical failure by scrutiny.

(*d*) *Test.* To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc.

(*e*) *Replace.* To substitute serviceable components, assemblies, or subassemblies, for unserviceable components, assemblies, or subassemblies.

(*f*) *Repair.* To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

(*g*) *Aline.* To adjust two or more components of an electrical system so that their functions are properly synchronized.

(*h*) *Calibrate.* To determine, check, or rectify the graduation of an instrument, weapon, or weapons system, or components of a weapons system.

(*i*) ***Overhaul.*** To restore an item to *completely serviceable* condition as prescribed by serviceability standards developed and published by heads of technical services. This is accomplished through employment of the technique of "Inspect and Repair Only as Necessary" (IROAN). Maximum utilization of diagnostic and test equipment is combined with minimum disassembly of the item during the overhaul process.

(*j*) ***Rebuild.*** To restore an item to a standard as near as possible to original or new condition in appearance, performance, and life expectancy. This is accomplished through the maintenance technique of complete disassembly of the item, inspection of all parts or components, repair or replacement of worn or unserviceable elements using original manufacturing tolerances and/or specifications and subsequent reassembly of the item.

(3) *1st, 2d, 3d, 4th, 5th echelon.* The symbol X placed in columns 3 through 7 indicates the echelon responsible for performing that particular maintenance operation, but does not necessarily indicate that repair parts will be stocked at that level. Echelons higher than the echelon marked by X are authorized to perform the indicated operation.

(4) *Tools required.* This column indicates codes assigned to each individual tool equipment, test equipment, and maintenance equipment referenced. The grouping of codes in this column of the maintenance allocation chart indicates the tool, test, and maintenance equipment required to perform the maintenance function.

(5) *Remarks.* Entries in this column will be utilized when necessary to clarify any of the data cited in the preceding columns.

c. Columns in the allocation of tools for maintenance functions are as follows:

(1) *Tools required for maintenance functions.* This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

(2) *1st, 2d, 3d, 4th, 5th echelon.* The dagger (†) symbol in these columns indicates the echelons normally allocated the facility.

(3) *Tool code.* This column lists the tool code assigned.

2. Maintenance by Using Organizations

When this equipment is used by signal services organizations organic to theater headquarters or communication zones to provide theater communications, those maintenance functions allocated up to and including fourth echelon are authorized to the organization operating this equipment.

Maintenance Allocation Chart

(1) Part or component	(2) Maintenance function	(3) 1 st ech	(4) 2d ech	(5) 3d ech	(6) 4th ech	(7) 5th ech	(8) Tools required	(9) Remarks
RECEIVER, RADIO R–853/URR.	Inspect	X						Preventative maintenance.
	Test		X				8, 11	
	Replace		X				8, 11	
	Repair			X			1, 2, 3, 4, 5, 8, 9, 12, 13	
	Calibrate				X		1, 2, 3, 4, 5, 6, 9, 10, 12, 13	
	Rebuild					X	1, 2, 3, 4, 6, 7, 9, 10, 12, 13	
	Overhaul					X	1, 2, 3, 4, 5, 6, 7, 9, 10, 12, 13	

Allocation of Tools for Maintenance Functions

(1) Tools required for maintenance functions	(2) 1st ech	(3) 2d ech	(4) 3d ech	(5) 4th ech	(6) 5th ech	(7) Tool code	(8) Remarks
R–853/URR (continued)							
SIGNAL GENERATOR AN/URM–25			†	†	†	1	
SIGNAL GENERATOR AN/URM–70			†	†	†	2	
VOLTMETER, ME 30/U			†	†	†	3	
AUDIO OSCILLATOR TS–382/U			†	†	†	4	
MULTIMETER TS–352/U			†	†	†	5	
DISTORTION TEST SET TS–723/U				†	†	6	
TEST SET, ELECTRON TUBE TV–2/U					†	7	
TEST SET, ELECTRON TUBE TV–7/U		†	†	†		8	
ELECTRONIC MULTIMETER TS–505/U			†	†	†	9	
FREQUENCY METER AN/URM–32				†	†	10	
TOOL KIT TK–115		†				11	
TOOL KIT TK–87			†	†	†	12	
TOOL KIT TK–88			†	†	†	13	

Page 19. **Delete appendix III and substitute:**

APPENDIX III
BASIC ISSUE ITEMS LIST

1. General

This appendix lists items supplied for initial operation and for running spares. The list includes tools, parts, and material issued as part of the major end item. The list includes all items authorized for basic operator maintenance of the equipment. End items of equipment are issued on the basis of allowances prescribed in equipment authorization tables and other documents that are a basis for requisitioning.

2. Columns

Columns are as follows:

a. Federal Stock Number. This column lists the 11-digit Federal stock number.

b. Designation by Model. Not used.

c. Description. Nomenclature or the standard item name and brief identifying data for each item are listed in this column. When requisitioning, enter the nomenclature and description.

d. Unit of Issue. The unit of issue is each unless otherwise indicated and is the supply term by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

e. Expendability. Nonexpendable items are indicated by NX. Expendable items are not annotated.

f. Quantity Authorized. Under "Items Comprising an Operable Equipment", the column lists the quantity of items supplied for the initial operation of the equipment. Under "Running Spare Items" the quantities listed are those issued initially with the equipment as spare parts. The quantities are authorized to be kept on hand by the operator for maintenance of the equipment.

g. Illustrations. The "Item No." column lists the reference symbols used for identification of the items in the illustration or text of the manual.

SECTION II. FUNCTIONAL PARTS LIST

FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY AUTH	ILLUSTRATION	
						FIGURE NO.	ITEM NO.
5820-752-5314		RECEIVER, RADIO R-853/URR		NX			
		ITEMS COMPRISING AN OPERABLE EQUIPMENT					
Ord thru AGC		TECHNICAL MANUAL TM 11-5820-393-12			2		
		RUNNING SPARE ITEMS					
5960-262-0190		ELECTRON TUBE: MIL type 6AB4			1		V2
5960-168-6589		ELECTRON TUBE: MIL type 6BJ6			1		V1
5960-262-0167		ELECTRON TUBE: MIL type 12AT7WA			1		V3
5960-577-1367		ELECTRON TUBE: MIL type 12AU6			1		V6
5960-166-7665		ELECTRON TUBE: MIL type 12BA6			1		V4,V5
5960-189-5922		ELECTRON TUBE: MIL type 19T8			1		V7
5960-208-5334		ELECTRON TUBE: MIL type 35C5			1		V8
5960-100-7123		ELECTRON TUBE: MIL type 35Z5GT			1		V9

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1 Jun 63

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Sig Sec, GENDEP (5)
Army Dep (2) except
  Ft Worth (8)
  Lexington (12)
  Sacramento (28)
  Tobyhanna (12)
USA Elct RD Actv, White Sands (13)
USA Elct Rd Actv, Ft Huachuca (2)
USA Trans Tml Comd (1)
Army Tml (1)
POE (1)
USAOSA (1)
AMS (1)
WRAMC (1)
AFIP (1)
Army Pic Cen (2)
USA Mbl Spt Cen (1)
USA Elct Mat Agcy (12)
Chicago Proc Dist (1)
USARCARIB Sig Agcy (1)
Sig Fld Maint Shop (3)
Units org under fol TOE (2 cy ea
  except as indicated)
  11–7
  11–16
  11–57
  11–98
  11–117
  11–155
  11–157
  11–500 (AA–AC) (4)
  11–557
  11–587
  11–592
  11–597

NG: State AG (3); units — same as active Army except allowance is one copy to each unit.
USAR: None.
For explanation of abbreviations used, see AR 320–50.

☆ U. S. GOVERNMENT PRINTING OFFICE: 1963

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. This manual describes Receiver, Radio R–853/URR and covers its installation, operation, and organizational maintenance. It includes operation under usual conditions, cleaning and inspection of the equipment, and replacement of parts available to second echelon maintenance.

b. Throughout this manual, Receiver, Radio R–853/URR is referred to as the receiver.

2. Forms and Records

a. Unsatisfactory Equipment Report. Fill out and forward DA Form 468 (Unsatisfactory Equipment Report) to the Commanding Officer, U. S. Army Signal Materiel Support Agency, ATTN: SIGMS–MLM, Fort Monmouth, N. J., as prescribed in AR 700–38.

b. Report of Damaged or Improper Shipment. Fill out and forward DD form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700–58 (Army).

c. Preventive Maintenance Forms. Prepare DA Form 11–238 (fig. 6 and 7), (Maintenance Check List for Signal Equipment (Sound Equipment, Radio, Direction Finding, Radar, Carrier, Radiosonde and Television)) in accordance with instructions on the form.

d. Parts List Form. Forward DA Form 2028 (Recommended Changes to DA Technical Manual Parts Lists or Supply Manuals 7, 8, 9) direct to the Commanding Officer, U. S. Army Signal Materiel Support Agency, ATTN: SIGMS–MLM, Fort Monmouth, N.J., with comments on parts listings in Appendixes II and III.

e. Comments on Manual. Forward any additional comments on this publication direct to the Commanding Officer, U. S. Army Signal Materiel Support Agency, ATTN: Pub Engrg Dept, Fort Monmouth, N. J.

Section II. DESCRIPTION AND DATA

3. Purpose and Use

The receiver is used for reception of information and entertainment programs in the amplitude modulation (am.) or frequency modulation (fm) standard broadcast frequency ranges. A phonograph record player using a crystal or ceramic pickup may be plugged into the PHONO INPUT jack (fig. 3) provided on the rear panel of the receiver. The receiver is used to reproduce the sound.

4. Technical Characteristics

Receiver type ..... Superheterodyne.
Frequency Range:
Am. ..... 535 kc to 1,620 kc.
Fm ..... 88 mc to 108 mc.
Types of signals received .. Broadcast.
Input voltages ..... 110 v ac or dc.
150 v ac or dc.
220 v ac or dc.
Antenna requirements:
Am. operation ..... Built-in loop antenna.
Fm operation ..... External fm antenna required.

5. Components of Receiver, Radio R–853/URR (fig. 1)

a. Components.

Quantity (ea)	Item	Height (in.)	Depth (in.)	Width (in.)	Unit weight (lb)
1	Receiver, Radio R–853/URR	10 5/8	7 11/16	16	14
1	Adapter, Connector U–212/U	1 7/8	1 1/2	9/16	0.25
2	TM 11–5820–393–12				
1 set	Running spares (*b* below)				

b. Running spares

Quantity (ea)	Item
1	Electron tube, 6AB4
1	Electron tube, 6BJ6
1	Electron tube, 12AT7
1	Electron tube, 12AU6
2	Electron tube, 12BA6
1	Electron tube, 19T8
1	Electron tube, 35C5
1	Electron tube, 35Z5

6. Description (fig. 1)

a. The receiver is housed in a wooden cabinet. The front panel contains the controls required for operation of the receiver for broadcast reception. The RADIO-PHONO switch and the PHONO INPUT jack are located on the rear panel (fig. 3). The LINE VOLTS selector switch (fig. 4) for available input voltage selection is accessible by removing the rear cover. A loop antenna for am. operation is fastened to the inside rear cover. Connections for an fm antenna are located on the rear cover (fig. 4).

b. An accessory, Adapter, Connector U–212/U (fig. 1), is provided for use in countries where the plug prong size differs from the standard used in the United States.

CHAPTER 2

INSTALLATION AND OPERATING INSTRUCTIONS

7. Unpacking
(fig. 2)

When packed for shipment, the receiver and its spare parts are placed in a corrugated box. Rigid cardboard inserts positioned between the receiver and the inner surfaces of the shipping container protect the receiver from shock. Perform all the steps outlined in *a* through *h* below when unpacking the receiver.

a. Place the shipping carton on a hard, flat surface.

b. Cut the taped seams with a knife or other sharp instrument; do not cut too deeply, because the receiver case may become damaged.

c. Fold back the flaps on top of the box.

d. Remove the envelope containing the technical manuals.

e. Remove the top pad.

f. Remove the four corner pads.

g. Remove the receiver from the carton.

h. Remove the spare parts container.

8. Checking Unpacked Equipment

a. Inspect the equipment for possible damage incurred during shipment. If the equipment has been damaged, refer to paragraph 2*b*.

b. See that the equipment is complete as listed on the packing slip. If a packing slip is not available, check the equipment against the table of components in paragraph 5.

9. Installation

a. When fm stations are to be received, connect the leads from the fm antenna to the two fm antenna connections on the rear cover of the receiver (fig. 3).

b. Set the LINE VOLTS selector switch (fig. 4) in the position corresponding to the voltage of the available power source.

***Caution:* An incorrect position can cause serious damage to the receiver.**

c. Plug the power cord into a convenient outlet. In locations where the power outlet receptacles do not accept the line cord plug, insert the U–212/G into the outlet and then plug the line cord into it.

10. Controls and Connectors
(fig. 5)

Control	Function
Volume control	In extreme left (counterclockwise) position, turns receiver off. When turned to the right (clockwise), turns receiver on and adjusts volume.
TONE control	Adjusts the tone quality of the receiver.
AM—FM-AFC —FM switch	Selects type of broadcast signal to be received. Sw pos — Function AM — Permits reception of am. broadcast signals. FM–AFC — Permits reception of fm broadcast signals; receiver is automatically kept tuned to station. FM — Permits reception of fm broadcast signals without automatic tuning feature. If receiver drifts out of tune, it must be retuned by hand.
TUNING control	Permits selection of any am. or fm broadcast station within range of the receiver.
RADIO-PHONO switch (fig.3)	Sw pos — Function RADIO — Permits normal radio reception. PHONO — Permits phonograph record reproduction through the receiver when a suitable record player is connected to the PHONO INPUT jack (fig. 3) on the rear of the receiver.
LINE VOLTS switch (fig.4)	Adjusts receiver for operation from 110-, 150-, or 220-volt power source.

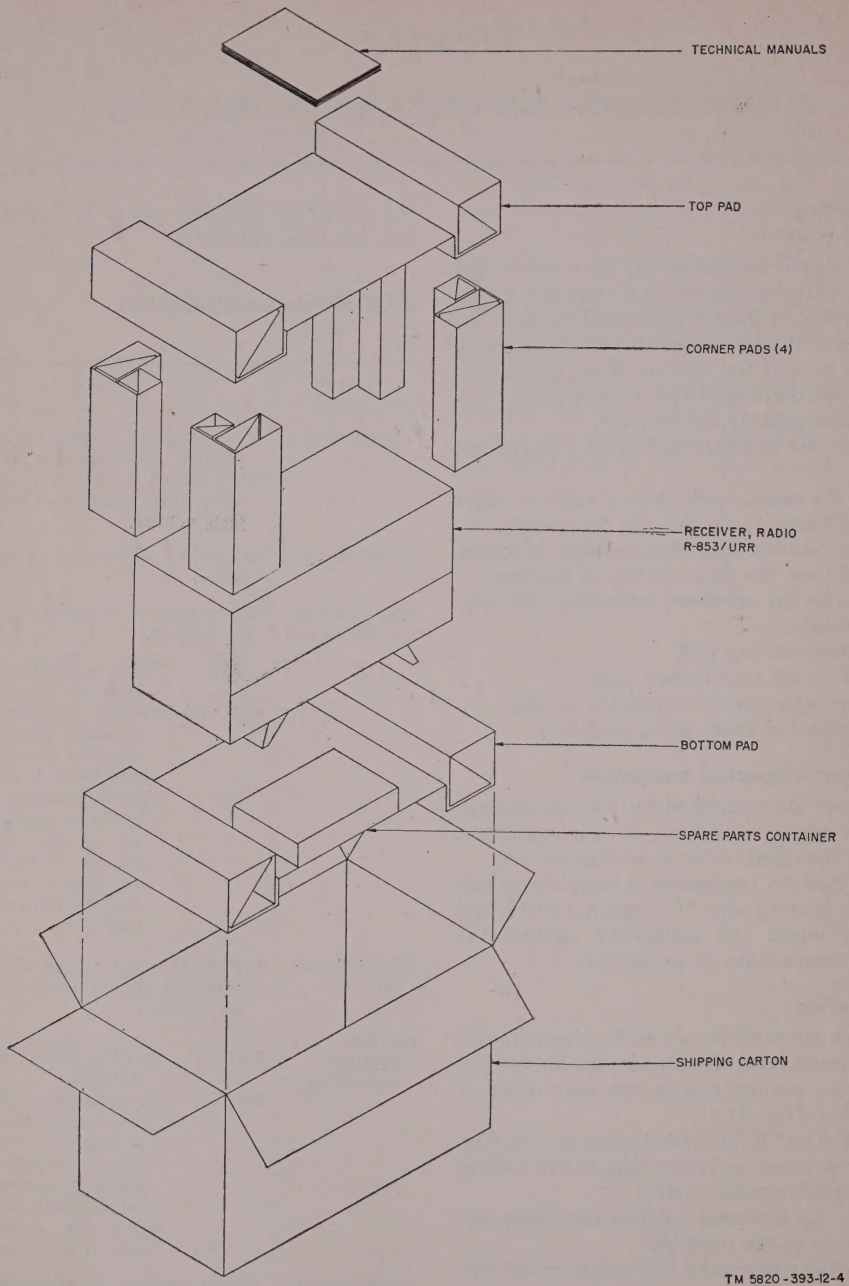

Figure 2. Packaging diagram.

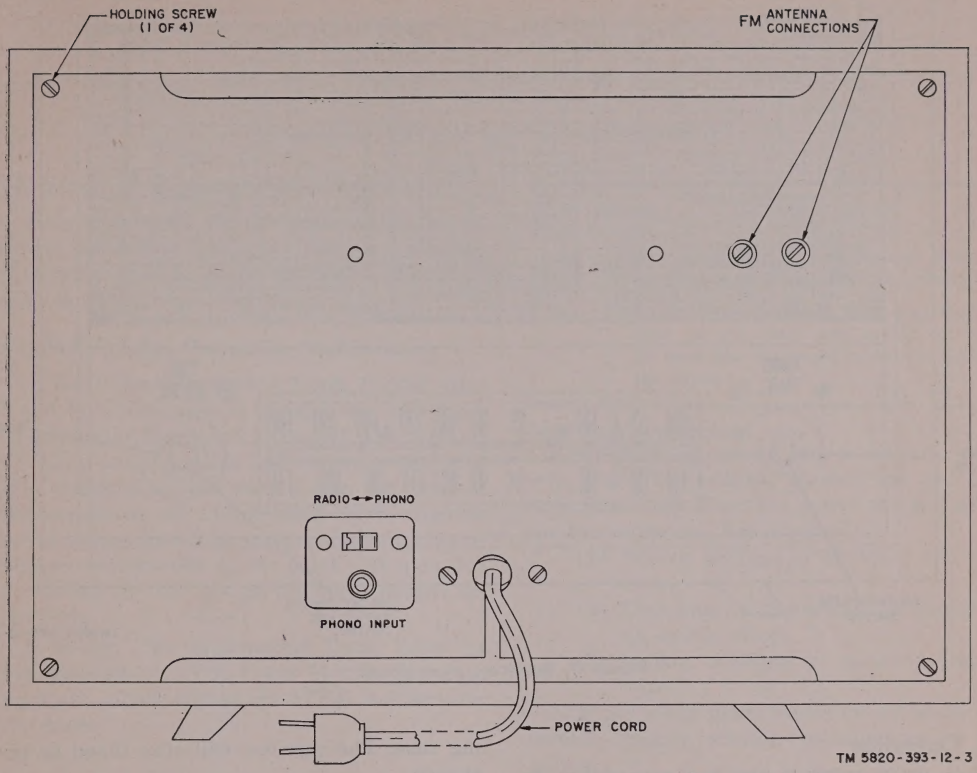

Figure 3. Receiver, rear view.

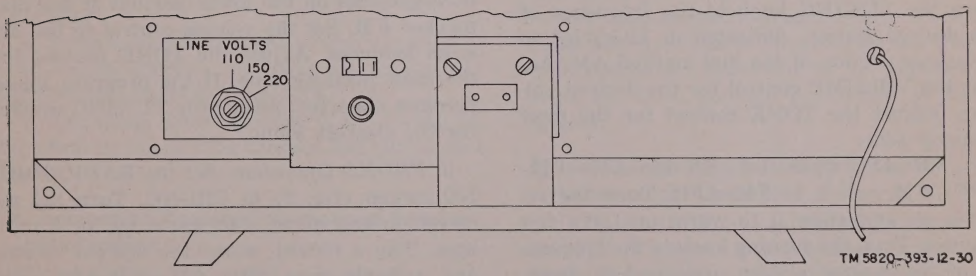

Figure 4. Receiver, rear cover removed to show LINE VOLTS switch.

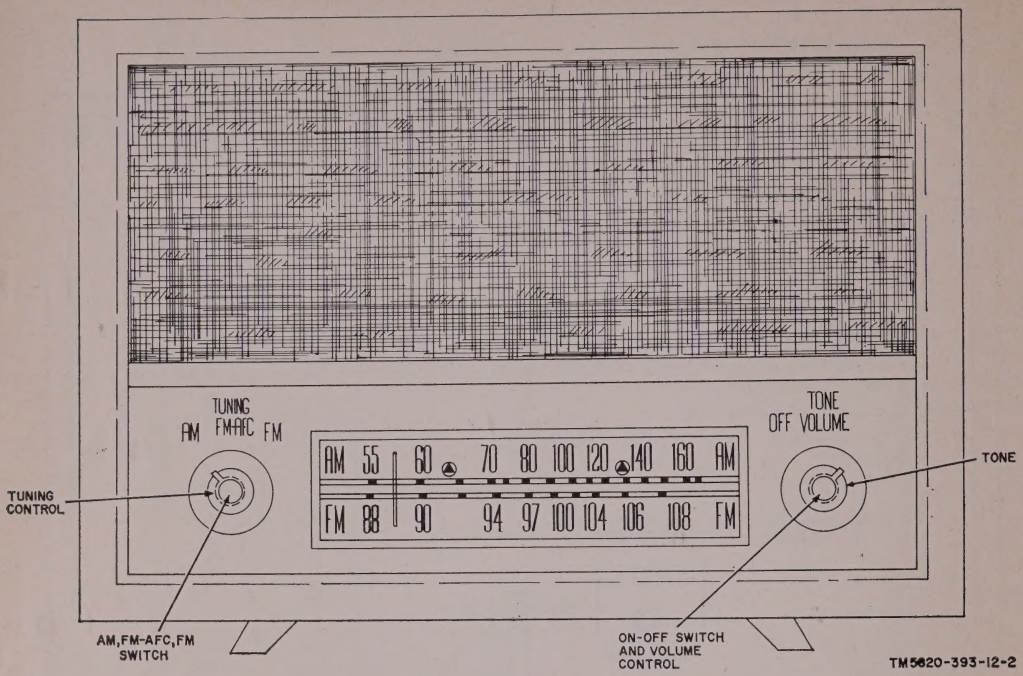

Figure 5. Receiver, front panel.

11. Operation

Note. Before trying to tune in a radio station, be sure that the RADIO-PHONO switch at the rear of the receiver is in the RADIO position.

a. AM Operation. Set the AM—FM-AFC—FM switch (fig. 5) to AM. Turn the receiver on and allow it to warm up for a few minutes. Turn the TUNING knob to the frequency of the desired station, indicated in kilocycles on the upper portion of the dial marked AM. Adjust the VOLUME control for the desired volume. Adjust the TONE control for the most pleasing tone.

b. FM–AFC Operation. Set the AM—FM–AFC—FM switch to FM–AFC. Turn the receiver on and allow it to warm up for a few minutes. Turn the turning knob to the frequency of the desired station, indicated in megacycles on the lower portion of the dial marked FM. Set the VOLUME control to the desired loudness. Adjust the TONE for the most pleasing tone. The receiver will stay tuned to the station.

c. FM Operation. Set the AM—FM-AFC—FM switch to FM. Turn the receiver on and allow it to warm up. Turn the TUNING knob to the frequency of the desired station, indicated in megacycles on the lower portion of the dial marked FM. Set the volume control to the desired loudness. Adjust the TONE control for the most pleasing tone. If the program sound becomes distorted, retune the TUNING control for the clearest sound.

d. PHONO Operation. Set the RADIO-PHONO switch (fig. 3) to PHONO. Turn the receiver on and allow it to warm up for 5 minutes. Play a record; select the desired volume and suitable tone. The AM—FM-AFC—FM switch and TUNING control have no effect while the receiver is being used in PHONO operation.

CHAPTER 3

MAINTENANCE INSTRUCTIONS

Section I. OPERATOR'S MAINTENANCE

12. Scope of Operator's Maintenance

Maintenance by the operator is limited to visual inspection (para 14) and first echelon preventive maintenance (para 13). No tools are required.

13. First Echelon Preventive Maintenance

a. DA Form 11–238. DA Form 11–238 (fig. 6 and 7) is a preventive maintenance checklist. The operator uses items 1 through 4, 7, 10, and 11. Items not applicable to first and second echelon maintenance are lined out in the figures. References in the ITEM block in the figures are to paragraphs that contain additional maintenance information on the particular item. Instructions for the use of the form appear on the form.

b. Items. The information listed below is supplementary to DA Form 11-238. The item numbers correspond to the ITEM numbers on the form.

Item	Maintenance procedures
2	Use a clean cloth to remove dust, dirt, moisture, and grease from the receiver.
3	All control knobs should work smoothly, be tight on the shaft, and should not bind. Be sure that the knobs do not rub against the panel.

14. Visual Inspection

a. When the equipment fails to perform properly, check the settings of switches and controls (para 10). Turn the power off and check for the conditions listed below.

(1) Wrong settings of switches and controls.
(2) Disconnected power cord or fm antenna lead-in wire.
(3) Broken antenna or antenna lead-in wire.

b. If the above-listed checks do not locate the trouble, higher echelon maintenance is required.

Section II. SECOND ECHELON MAINTENANCE

15. Scope of Second Echelon Maintenance

Second echelon maintenance consists of the following:

a. Second echelon preventive maintenance.

b. Troubleshooting by using the equipment performance checklist (para 18).

c. Replacing, where necessary, the U–212/U, the electron tubes, tube shields, dial lamps, and knobs.

16. Equipment Required for Second Echelon Maintenance

The following equipment is required:

a. Multimeter AN/URM–105.
b. Test Set, Electron Tube TV–7/U.
c. Tool Equipment TE–41.

17. Second Echelon Preventive Maintenance

a. DA Form 11–238. DA Form 11–238 (fig. 6 and 7) is a preventive maintenance check list. Items not applicable to first and second echelon maintenance are lined out in the figures. All items not lined out are performed at second echelon.

18. Troubleshooting by Using Equipment Performance Checklist

a. General. The equipment performance checklist (*b* below) will help maintenance personnel determine whether the receiver is functioning properly. The checklist gives the item to be checked, the normal indications of correct operation, and the corrective measures that can

be taken. To use the list, follow the items in numerical sequence. If the corrective measures given do not fix the receiver, troubleshooting at a higher echelon is required. Note on the repair tag how the receiver performed.

b. Equipment Performance Checklist.

	Item no.	Item	Action or condition	Normal indications	Corrective measures
PREPARATORY	1	VOLUME control	Set to OFF.		
	2	Antenna	FM antenna wires connected.		
	3	LINE VOLTS selector switch.	LINE VOLTS selector switch in position corresponding to available voltage source.		
	4	Power cord	Power cord connected to receiver and to correct power source.		
	5	AM—FM-AFC—FM selector switch.	Set to AM.		
	6	TONE control	Set at full counterclockwise position.		
	7	RADIO-PHONO switch.	Set at RADIO.		
START	8	VOLUME control	Turn clockwise slowly throughout its entire range.	Dial lamps light. Hum or am. radio broadcast hear in varying volume.	Check power cord connection to power outlet socket. Check dial lamps (para 20). Check tubes (para 21).
	9	TUNING control	Slowly turn throughout entire range.	All am. stations within range of receiver are heard.	Higher echelon repair required.
	10	AM—FM-AFC—FM selector switch	Set at FM.		
	11	TUNING CONTROL	Slowly turn throughout entire range.	All fm stations within range of receiver are heard.	Check connections to fm antenna (fig. 3). Check the 12AU6 and the 19T8 tubes.
	12	AM—FM-AFC—FM selector switch	Set at FM-AFC.		
	13	TUNING control		All fm stations within range of receiver are heard. The receiver should not drift off frequency.	If stations are heard, but the receiver drifts off frequency, check the 6AB4 tube (para 21).
	14	TUNING control	Tune in a clear, strong fm station.		
	15	TONE control	Slowly turn fully clockwise.	Tonal quality of signals being received varies; higher tones become clearer.	Higher echelon repair required.
	16	PHONO-RADIO switch	Set at PHONO. Connect record player to PHONO jack and play a record; adjust volume to suit.	Record being played is heard in receiver.	Higher echelon repair required.

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
26. ~~INSPECT ANTENNA FOR ECCENTRICITIES, CORROSION, LOOSE FIT, DAMAGED INSULATORS AND REFLECTORS.~~	
27. CHECK FOR NORMAL OPERATION.	✓
28. ~~BEFORE SHIPPING OR STORING, REMOVE BATTERIES~~	

IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING THE INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.

ITEM 4. SET INOPERATIVE 11 JUNE 60. NOTIFIED 2D ECHELON LW. REPLACED 35C5 TUBE P.P.

MAINTENANCE CHECK LIST FOR SIGNAL EQUIPMENT

SOUND EQUIPMENT, RADIO, DIRECTION FINDING
RADAR, CARRIER, RADIOSONDE AND TELEVISION

(AR 750-625)

EQUIPMENT NOMENCLATURE

RECEIVER, RADIO R-853/URR

EQUIPMENT SERIAL NUMBER

111

INSTRUCTIONS

This form may be used for a period of one month by using the correct dates and weeks of the month. It is to be used as a Preventive Maintenance check list for Signal equipment in actual use, or for a check on equipment prior to issue.

1. For detailed Preventive Maintenance instructions see:
   a. The Technical Manual *(in TM 11 series)* for the equipment. *(See DA Pamphlet Number 310-4)*
   b. The Supply Bulletin *(SB 11-100 series)* for the equipment. *(See DA Pamphlet Number 310-4)*
   c. The Department of the Army Lubrication Order. *(See DA Pamphlet Number 310-4)*

2. The following action will be taken by either the Communications Officer/ Chief for 1st echelon, or the Inspector for higher echelon:
   a. Enter Equipment Nomenclature and Serial Number.
   b. Strike out items that do not apply to the equipment.

3. Operator/Inspector will enter in the columns entitled CONDITION, on the proper line, a notation regarding the condition, using symbols specified under LEGEND.

4. After operator completes each daily inspection he will initial over the appropriate dates under "Daily Condition for Month", then return form to his supervisor.

FOLD

TYPE OF INSPECTION

OPERATOR	2/3 ECHELON	DATE	SIGNATURE
✓		JUNE 6, 1960	Lawrence West
	✓	JUNE 17 '60	Paul Pribonas

DA FORM 1 MAY 57 11-238

REPLACES DA FORMS 11-238, 1 NOV 55; 11-239, 11-244, 11-245, 11-246, 11-249, 11-250, AND 11-251; WHICH ARE OBSOLETE.

Figure 6. DA Form 11-238, pages 1 and 4.

LEGEND for marking conditions:
Satisfactory, ✓.
Adjustment, Repair or Replacement required, X.
Defect corrected, (X)

DAILY CONDITION FOR MONTH OF JUNE 1960

NO.	DAILY ITEM	1 LW 17	2 LW 18	3 LW 19	4 LW 20	5 LW 21	6 LW 22	7 LW 23	8 LW 24	9 LW 25	10 LW 26	11 LW 27	12 28	13 29	14 30	15 31	16	2D 3D ECHELON
1.	COMPLETENESS AND GENERAL CONDITION OF EQUIPMENT. (~~Transmitter, receiver, carrying cases,~~ wire, ~~cables, microphones,~~ tubes, spare parts, technical manuals).	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						✓
2.	CLEAN DIRT AND MOISTURE FROM ANTENNA, ~~MICRO-PHONES, HEADSETS, KEYS,~~ JACKS, PLUGS. ~~COMPONENT PANELS.~~ PARA 13b	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						✓
3.	INSPECT CONTROLS FOR NORMAL OPERATION. ~~TAP CONTROLS LIGHTLY FOR EVIDENCE OF CUT OUT FROM LOOSE CONTACTS.~~ PARA 13b	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						✓
4.	CHECK FOR NORMAL OPERATION OF EQUIPMENT. BE ALERT FOR UNUSUAL OPERATION OR CONDITION.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X						⊗

WEEKLY	CONDITION EACH WEEK 1ST	2D	3D	4TH	5TH	2D 3D ECH
5. ~~CLEAN AND TIGHTEN EXTERIORS OF CASES, RACKS, MOUNTS, TRANSMISSION LINES.~~						
6. ~~INSPECT CASES, MOUNTS, ANTENNA TOWERS AND EXPOSED METAL SURFACES FOR RUST, CORROSION.~~						
7. INSPECT CORDS, CABLE, WIRE, ~~SHOCK MOUNTS~~ FOR CUTS, KINKS, BREAKS, FRAYING, UNDUE STRAIN.	✓	✓				✓
8. ~~CHECK ANTENNA GUY WIRES FOR PROPER TENSION OR DAMAGE.~~						
9. ~~INSPECT CANVAS AND LEATHER ITEMS FOR MILDEW, TEARS, FRAYING.~~						
10. INSPECT ACCESSIBLE ITEMS FOR LOOSENESS: SWITCHES, KNOBS, JACKS, CONNECTORS, ~~RELAYS, TRANSFORMERS, MOTORS,~~ PILOT LIGHTS, ~~BLOWERS,~~ ETC.	✓	✓				✓
11. CLEAN ~~AND/OR INSPECT AIR FILTERS, BRASS~~ NAME PLATES, DIAL ~~AND~~ METER WINDOWS.	✓	✓				✓
12. ~~INSPECT STORAGE BATTERIES FOR DIRT, LOOSE TERMINALS, SPECIFIC GRAVITY, DAMAGED CASES. INSPECT DRY BATTERIES FOR LEAKAGE.~~						

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
13. ~~INSPECT SHELTERS AND COVERS FOR ADEQUACY OF WEATHER-PROOFING, TEARS, FRAYING.~~	
14. ~~CHECK TERMINAL BOX COVERS FOR CRACKS, DIRT, LEAKS, DAMAGED GASKETS, GREASE.~~	

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
15. INSPECT SEATING OF READILY ACCESSIBLE PLUCK-OUT ITEMS: TUBES, LAMPS, ~~FUSES, CRYSTALS,~~ CONNECTORS, ~~VIBRATORS, PLUG-IN COILS.~~	✓
16. ~~INSPECT RELAYS AND CIRCUIT BREAKERS FOR LOOSE MOUNTINGS, BAD CONTACTS, MIS-ALINEMENT OF CONTACTS AND SPRINGS, PROPER SPRING TENSION.~~	
17. ~~INSPECT VARIABLE CAPACITORS FOR DIRT, MIS-ALINEMENT OF PLATES, LOOSE MOUNTINGS, MOISTURE.~~	
18. ~~INSPECT RESISTORS, BUSHINGS AND INSULATORS FOR CRACKS, CHIPPING, BLISTERING, MOISTURE, DISCOLORATION.~~	
19. ~~CLEAN AND TIGHTEN SWITCHES, TERMINAL BLOCKS, BLOWERS, RELAY CASES AND INTERIORS OF CHASSIS AND CABINETS NOT READILY ACCESSIBLE.~~	
20. ~~INSPECT TERMINAL BLOCKS FOR LOOSE CONNECTIONS, CRACKS AND BREAKS.~~	
21. ~~INSPECT TERMINALS OF LARGE FIXED CAPACITORS AND RESISTORS FOR DIRT, CORROSION, LOOSE CONTACTS.~~	
22. ~~INSPECT TRANSFORMERS, CHOKES, POTENTIOMETERS AND RHEOSTATS FOR OVERHEATING AND OIL LEAKAGE.~~	
23. ~~INSPECT GENERATORS, AMPLIDYNES, DYNAMOTORS FOR BRUSH WEAR, SPRING TENSION, ARCING AND FITTING OF COMMUTATOR.~~	
24. ~~INSPECT CATHODE RAY TUBES FOR BURNT SCREEN SPOTS.~~	
25. ~~INSPECT WATERPROOF GASKETS FOR LEAKS, WORN OR LOOSE PARTS.~~	

CONTINUED ON PAGE 4

2 3

Figure 1. DA Form 11-238, pages 2 and 3.

GPO: 1957 O—427034

19. Chassis Removal

To remove the chassis (fig. 1), proceed as follows:

a. Unplug the receiver.

b. Tilt the receiver forward and remove the four screws that hold the chassis in place.

c. Return the receiver to its normal position and pull off the control knobs from the front panel (fig. 5).

d. Remove the four holding screws that secure the rear cover (fig. 3).

Caution: **Leads from the am. and the fm antenna connection screws are attached between the chassis and the rear cover (fig. 3)). Do not pull off the rear cover too far.**

e. Remove the rear cover. Carefully remove the chassis from the case.

20. Replacement of Lamps

To remove and replace defective lamps, the chassis must be removed from the receiver case (para 19). Refer to figure 8 for location of lamps and proceed as follows:

a. Remove a defective lamp by pushing it upward and twisting it slightly to the left (counterclockwise).

b. Install a new lamp by pushing it upward and twisting it to the right (clockwise).

c. The required replacement lamp is a miniature bayonet base, 3.2 volts, 0.5 watt; Federal stock No. 6240–196–4501.

21. Tube-Testing Techniques

When trouble occurs, check the power cord, antenna connections, and the switch positions before removing the tubes. If tube failure is suspected, use the applicable procedure below to check the tubes. The chassis need not be removed from the receiver case to replace the tubes. To remove a tube shield, push down on it, twist it in a counterclockwise direction, and pull it off. Several tubes of this receiver are connected in series and will go out at one time. However, this does not mean that all tubes are defective. Check each tube carefully before discarding it.

Caution: **Do not rock or rotate a tube when removing it from a socket; pull it straight out with a tube puller.**

a. Use of Tube Tester. Remove and test one tube at a time. Discard a tube only if its defect is obvious or if the tube tester shows it to be defective. Do not discard a tube that tests at or near its minimum test limit on the tube tester. Put back the original tube before testing the next one.

b. Tube Substitution Method. Replace a suspected tube with a new or known good tube. If the receiver remains inoperative, remove the new tube and put back the original tube. Repeat this procedure with each suspected tube until the defective tube is located.

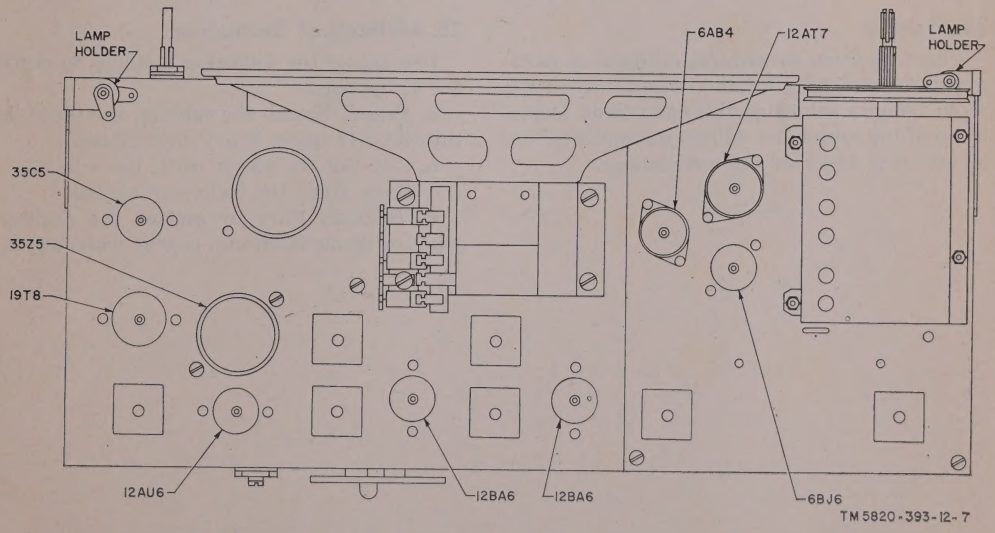

Figure 8. Tube and lamp location.

CHAPTER 4

SHIPMENT, LIMITED STORAGE, AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

22. Disassembly

Disassembly procedures for the receiver consist of the following:

a. Unplug the power cord from the receptacle, wind it into a coil, and tape it to the rear cover.

b. Disconnect the external antenna if used.

23. Repackaging for Shipment or Limited Storage

The exact procedure for repackaging depends on the material available and the conditions under which the equipment is to be shipped or stored. Use the procedures outlined below whenever possible. The information concerning the original packaging (para 7) will also be helpful.

a. Wrap the technical manuals in a waterproof-barrier material. Seal all the seams and folds with pressure-sensitive tape.

b. Store all running spares in the original container, if it is available. Otherwise, suitably wrap the parts in corrugated paper and waterproof-barrier material and seal them with pressure-sensitive tape.

c. Cushion the receiver in a container with pads fabricated of double-faced, corrugated paper. Secure the cushioning with gummed paper tape. Seal the shipping container with gummed paper tape.

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

24. General

The demolition procedures outlined in paragraph 25 will be used to prevent the enemy from using or salvaging this equipment. Demolition of the equipment will be accomplished only upon the order of the commander.

25. Methods of Destruction

Use any of the following methods to destroy the equipment.

a. Smash. Smash the cabinet, the tubes, and the chassis; use a heavy instrument.

b. Cut. Cut the power cord; use a knife.

c. Burn. Burn the technical manual.

d. Dispose. Bury or scatter the destroyed parts or throw them into nearby waterways.

APPENDIX I

REFERENCES

Following is a list of applicable references that are available to the operator of Receiver, Radio R–853/URR.

DA Pam 108–1	Index of Army Motion Pictures, Film Strips, Slides, and Phono-Recordings.
DA Pam 310–4	Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
FM 21–5	Military Training.
FM 21–6	Techniques of Military Instruction.
FM 21–30	Miltary Symbols.
SR 320–5	Dictionary of United States Army Terms.
SR 320–50	Authorized Abbreviations and Brevity Codes.
TM 11–5083	Electron Tube Test Sets TV–7/U, TV–7A/U, TV–7B/U, and TV–7D/U.

APPENDIX II

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

1. General

a. This appendix assigns maintenance functions and repair operations to be performed by the lowest appropriate maintenance echelon.

b. Columns in the maintenance allocation chart are as follows:

(1) *Part or Component.* This column shows only the nomenclature or standard item name. Additional descriptive data are included only where classification is necessary to identify the part.

(2) *Maintenance function.* This column indicates the various maintenance functions allocated to the echelon capable of performing the operations.

(*a*) *Inspect.* To verify serviceability and to detect by scrutiny incipient electrical or mechanical failure.

(*b*) *Test.* To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc.

(*c*) *Replace.* To substitute serviceable assemblies, subassemblies, and parts for unserviceable components.

(*d*) *Repair.* To restore to a serviceable condition by replacing unserviceable parts or by any other action required, using tools, equipment, and skills available, to include welding, grinding, riveting, straightening, adjusting, etc.

(*e*) *Rebuild.* To restore to a condition comparable to new by disassembling the item to determine the condition of its component parts and reassembling it with serviceable, rebuilt, or new assemblies, subassemblies, and parts.

(3) *1st, 2d, 3d, 4th, 5th echelon.* The symbol X indicates the echelon responsible for performing that particular maintenance operation, but does not necessarily indicate that repair parts will be stocked at that level. Echelons higher than the echelon marked by X are authorized to perform the indicated operation.

(4) *Tools required.* This column indicates codes assigned to each individual tool equipment, test equipment, and maintenance equipment referenced. The grouping of codes in this column of the maintenance allocation chart indicates the tool, test, and maintenance equipment required to perform the maintenance function.

(5) *Remarks.* Entries in this column are used when necessary to clarify any of the data cited in the preceding columns.

c. Columns under allocation of tools for maintenance functions are as follows:

(1) *Tools required for maintenance functions.* This column lists tool, test, and maintenance equipment required to perform the maintenance functions.

(2) *1st, 2d, 3d, 4th, 5th echelon.* A dagger (†) symbol indicates the echelons allocated the facility.

(3) *Tool code.* This column lists the tool code assigned.

2. Maintenance by Using Organizations

When this equipment is used by signal service organizations organic to theater headquarters or communications zones to provide theater communications, those maintenance functions allocated up to and including fourth echelon are authorized to the organization operating this equipment.

3. Mounting Hardware

The basic entries of the maintenance allocation chart do not include mounting hardware such as screws, nuts, bolts, washers, brackets, clamps, etc.

(1) PART OR COMPONENT	(2) MAINTENANCE FUNCTION	(3) 1ST ECH.	(4) 2ND ECH.	(5) 3RD ECH.	(6) 4TH ECH.	(7) 5TH ECH.	(8) TOOLS REQUIRED	(9) REMARKS
RECEIVER, RADIO R-853/URR								
	inspect	X					Visual	Preventative Maintenance
	test		X				11	Preventative Maintenance
	replace		X				11	
	repair			X			1,2,3,4,5,8,10	
	rebuild					X	1,2,3,4,6,7,9,10	
ADAPTER, CONNECTOR	replace		X					
CAPACITOR	replace			X				
CHOKE	replace			X				
CONNECTOR, PLUG	replace			X				
CONNECTOR, RECEPTACLE	replace			X				
ELECTRON TUBE	replace		X					
KNOB	replace		X					
LAMP	replace		X					
LAMPHOLDER	replace			X				
RESISTOR	replace			X				
SHIELD, ELECTRON TUBE	replace		X					
SOCKET	replace			X				
SPEAKER	replace			X				
SWITCH	replace			X				
TRANSFORMER	replace			X				

(1) TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	(2) 1ST ECH.	(3) 2ND ECH.	(4) 3RD ECH.	(5) 4TH ECH.	(6) 5TH ECH.	(7) TOOL CODE	(8) REMARKS
R-853/URR (continued)							
RADIO FREQUENCY SIGNAL GENERATOR AN/URM-25			†	†	†	1	
SIGNAL GENERATOR AN/URM-70			†	†	†	2	
VOLTMETER, METER ME-30/U			†	†	†	3	
AUDIO OSCILLATOR TS-382/U			†	†	†	4	
MULTIMETER AN/URM-105		†	†	†	†	5	
SPECTRUM ANALYZER TS-723/U				†	†	6	
TEST SET, ELECTRON TUBE TV-2/U					†		
TEST SET, ELECTRON TUBE TV-7/U		†	†	†			
FREQUENCY METER AN/URM-32				†	†	9	
TOOL EQUIPMENT TE-113			†	†	†	10	
TOOL EQUIPMENT TE-41		†					

APPENDIX III

BASIC ISSUE ITEMS LIST, RECEIVER RADIO R–853/URR

Section I. INTRODUCTION

1. Scope

a. This appendix lists items supplied for initial operation and for running spares. The list includes material issued as part of the major end item. End items of equipment are issued on the basis of allowances prescribed in equipment authorization tables and other documents that are a basis for requisitioning.

b. Columns are as follows:

(1) *Source, maintenance, and recoverability code.* Not used.

(2) *Federal stock number.* This column lists the 11-digit Federal stock number. In the absence of a Federal stock number an interim number, for example, L8Ra41B–45 in the Description column indicates that Federal stock number is being processed for assignment. The L number may be used in emergencies to identify items.

(3) *Designation by model.* Not used.

(4) *Description.* Nomenclature or the standard item name and brief identifying data for each item are listed in this column. When requisitioning, enter the nomenclature and description on the requisition.

(5) *Unit of issue.* The unit of issue is the the supply term by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

(6) *Expendability.* Expendable items are indicated by the letter X; nonexpendable items are indicated by NX.

(7) *Quantity authorized.* Under "Items Comprising an Operable Equipment" the column lists the quantity of items supplied for the initial operation of the equipment. Under "Running Spares and Accessory Items" the quantities listed are those issued initially with the equipment as spare parts. The quantities are authorized to be kept on hand by the operator for maintenance of the equipment.

(8) *Illustration.* Not used.

(1) SOURCE MAINTENANCE AND RECOVERABILITY CODE	(2) FEDERAL STOCK NUMBER	(3) DESIGNATION BY MODEL	(4) DESCRIPTION	(5) UNIT OF ISSUE	(6) EXPENDABILITY	(7) QUANTITY AUTHORIZED	(8) ILLUSTRATIONS FIGURE NO.	(9) ILLUSTRATIONS ITEM NO.
			ITEMS COMPRISING AN OPERABLE EQUIPMENT					
			RECEIVER, RADIO R-853/URR					
	5820-752-5314		RECEIVER, RADIO R-853/URR	ea	NX			
	Ord thru AGC		TECHNICAL MANUAL TM 11-5820-393-12	ea	X	2		
			RUNNING SPARES AND ACCESSORY ITEMS					
			RECEIVER, RADIO R-853/URR					
	5960-166-7665		ELECTRON TUBE: MIL type 12BA6	ea	X	2		V4,V5
	5960-188-6589		ELECTRON TUBE: MIL type 6BJ6	ea	X	1		V1
	5960-262-0190		ELECTRON TUBE: MIL type 6BA4	ea	X	1		V2
	5960-166-7662		ELECTRON TUBE: MIL type 12AT7	ea	X	1		V3
	5960-262-0296		ELECTRON TUBE: MIL type 12AU6	ea	X	1		V6
	5960-189-5922		ELECTRON TUBE: MIL type 19T8	ea	X	1		V7
	5960-228-5334		ELECTRON TUBE: MIL type 35C5	ea	X	1		V8
			ELECTRON TUBE: MIL type 35Z5 ††LoRD10-43	ea	X	1		V9

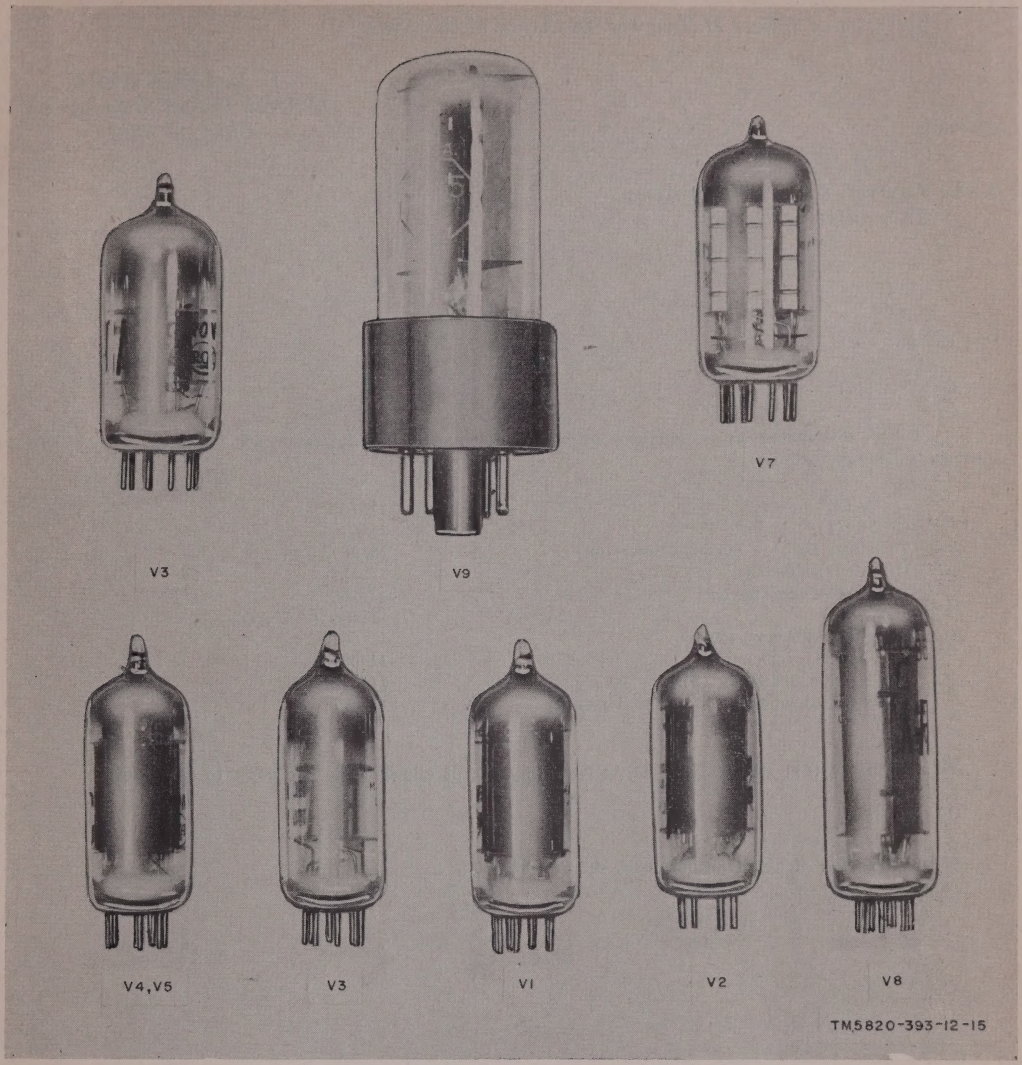

Figure 9. Running spares and accessory items.

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DEPARTMENT OF THE ARMY TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE REPAIR PARTS AND SPECIAL TOOL LISTS, RECEIVER, RADIO R-853/URR

Headquarters, Department of the Army, Washington 25, D.C.

24 October 1963

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	Parts for maintenance	2	2
	References	3	2
	Comments on parts lists	4	2
II.	FUNCTIONAL PARTS LIST		3

SECTION I

INTRODUCTION

1. Scope

a. This manual lists repair parts authorized for organizational maintenance and constitutes a basis of requisitioning when the major item of equipment is authorized to the organization. These equipments are issued on the basis of allowances prescribed in equipment authorization tables and other documents which are a basis of requisitioning.

b. Columns are as follows:

(1) *Federal stock number.* This column lists the 11-digit Federal stock number.

(2) *Designation by model.* Not used.

(3) *Description.* Nomenclature or the standard item name and brief identifying data for each item are listed in this column. When requisitioning, enter the nomenclature and description.

(4) *Unit of issue.* The unit of issue is each unless otherwise indicated and is the supply term by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

(5) *Expendability.* Nonexpendable items are indicated by NX. Expendable items are not annotated.

(6) *Quantity incorporated in unit.* This column lists the quantity of each part found in a given assembly, component, or equipment.

(7) *Organizational.* An asterisk (*) indicates that an item is not authorized for stockage but if required, may be requisitioned for immediate use only.

(8) *Illustration.* The "Item No." column lists the reference symbols used for identification of the items in the illustration or text of the manual.

*This manual supersedes TM 11-5820-393-20P, 29 September 1961.

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2. Parts for Maintenance

When this equipment is used by signal service organizations organic to the theater headquarters or communication zones to provide theater communications, those repair parts authorized up to and including fourth echelon are authorized for stockage by the organization operating this equipment.

3. References

A maintenance allocation chart and basic issue items are contained in TM 11-5820-393-12.

4. Comments on Parts Lists

Fill out and forward DA Form 2028 (Recommended Changes to DA Technical Manual Parts Lists or Supply Manual 7, 8, or 9), direct to: Commanding Officer, U.S. Army Electronics Materiel Support Agency, ATTN: SELMS-ML, Fort Monmouth, New Jersey, 07703.

SECTION II. FUNCTIONAL PARTS LIST

FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY IN UNIT	2d ORGANIZATIONAL	ILLUSTRATION	
							FIGURE NO.	ITEM NO.
5820-752-5314		RECEIVER, RADIO R-853/URR		NX				
5935-752-2975		ADAPTER, CONNECTOR U-212/U			1	*		P2
5960-262-0190		ELECTRON TUBE: MIL type 6AB4			1	*		V2
5960-188-6589		ELECTRON TUBE: MIL type 6BJ6			1	*		V1
5960-262-0167		ELECTRON TUBE: MIL type 12A7TWA			1	*		V3
5960-577-1367		ELECTRON TUBE: MIL type 12AU6			1	*		V6
5960-166-7665		ELECTRON TUBE: MIL type 12BA6			2	*		V4,V5
5960-189-5922		ELECTRON TUBE: MIL type 19T3			1	*		V7
5960-228-5334		ELECTRON TUBE: MIL type 35C5			1	*		V8
5960-100-7123		ELECTRON TUBE: MIL type 35Z5GT			1	*		V9
5355-817-1342		KNOB: press fit type; phenolic; Jetronics Ind part No. B-1904-1			1	*		
5355-817-1348		KNOB: press fit type; plastic; Jetronics Ind part No. 1903-4			1	*		
5355-834-6356		KNOB: press fit type; plastic; Jetronics Ind part No. B-1923-1			1	*		
5355-826-7788		KNOB: press fit type; phenolic, Jetronics Ind part No. B-1928-1			1	*		
6240-196-4501		LAMP, INCANDESCENT: 3.2 v, .5 w, 16 amp; G.E. part No. 1490			2	*		DS1,DS2
5960-280-8214		SHIELD, ELECTRON TUBE: accom tube style T5-1/2; steel; Eby part No. 9704-13			1	*		SH1
5960-183-8010		SHIELD, ELECTRON TUBE: accom tube style T6-1/2; steel; Eby part No. 9701-16			1	*		SH2

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USATC Engr (2)
USATC Inf (2)
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Field and Depot Maintenance Manual,

RECEIVER, RADIO R-853/URR

Change No. 1

HEADQUARTERS,
DEPARTMENT OF THE ARMY
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TM 11-5820-393-35, 25 January 1961, is changed as follows:

Page 3, paragraph 1. Delete subparagraph c and the note.

Add paragraphs 1.1 and 1.2 after paragraph 1.

1.1. Index of Publications

Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment. Department of the Army Pamphlet No. 310-4 is an index of current technical manuals, technical bulletins, supply manuals (types 4, 6, 7, 8, and 9), supply bulletins, lubrication orders, and modification work orders which are available through publications supply channels. The index lists the individual parts (-10, -20, -35P, etc.) and the latest changes to and revisions of each equipment publication.

1.2. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance with instructions in TM 38-750.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army), NAVSANDA Publication 378 (Navy), and AFR 71-4 (Air Force).

c. Reporting of Equipment Manual Improvements. The direct reporting by the individual user of errors, omissions, and recommendations for improving this equipment manual is authorized and encouraged. DA Form 2028 (Recommended Changes to DA Technical Manual Parts Lists or Supply Manual 7, 8, or 9) will be used for reporting these improvements. This form will be completed in triplicate using pencil, pen, or typewriter. The original and one copy will be forwarded direct to Commanding Officer, U.S. Army Electronics Materiel Support Agency, ATTN: SELMS-MP, Fort Monmouth, N.J., 07703. One information copy will be furnished to the individual's immediate supervisor (officer, noncommissioned officer, supervisor, etc.).

Page 7, paragraph 14. Make the following changes: Subparagraph *a.* Delete the third sentence and substitute:

The 110-volt input is also applied from J3 to the filament of V9 and dropping resistor R41 in series, and then to ground through contacts 5 and 8 of S3. Delete subparagraph *b* and *c* and substitute:

b. 150-Volt Operation. With LINE VOLTS switch S3 in the 150 position, the 150-volt input from J3 is applied to the filaments of V1 through V9 in series, through contacts 10 and 12 of S3. Voltage-dropping resistor R43 is placed in series with rectifier V9 when R42 is shorted out by contacts 14 and 16 of S3.

c. 220-Volt Operation. With LINE VOLTS switch S3 in the 220 position, the 220-volt input from J3 is applied to the filaments of tubes V1 through V9 in series with R41, through contacts 7, 8, 11, and 12 of S3. Voltage-dropping resistors R42 and R43 are in series with rectifier V9.

Page 30. Add the following to the appendix: TM 38-750 The Army Equipment Record System and Procedures.

Figure 13. (Superseded) Receiver, Radio R-853/URR, overall schematic diagram (Located in back of manual)

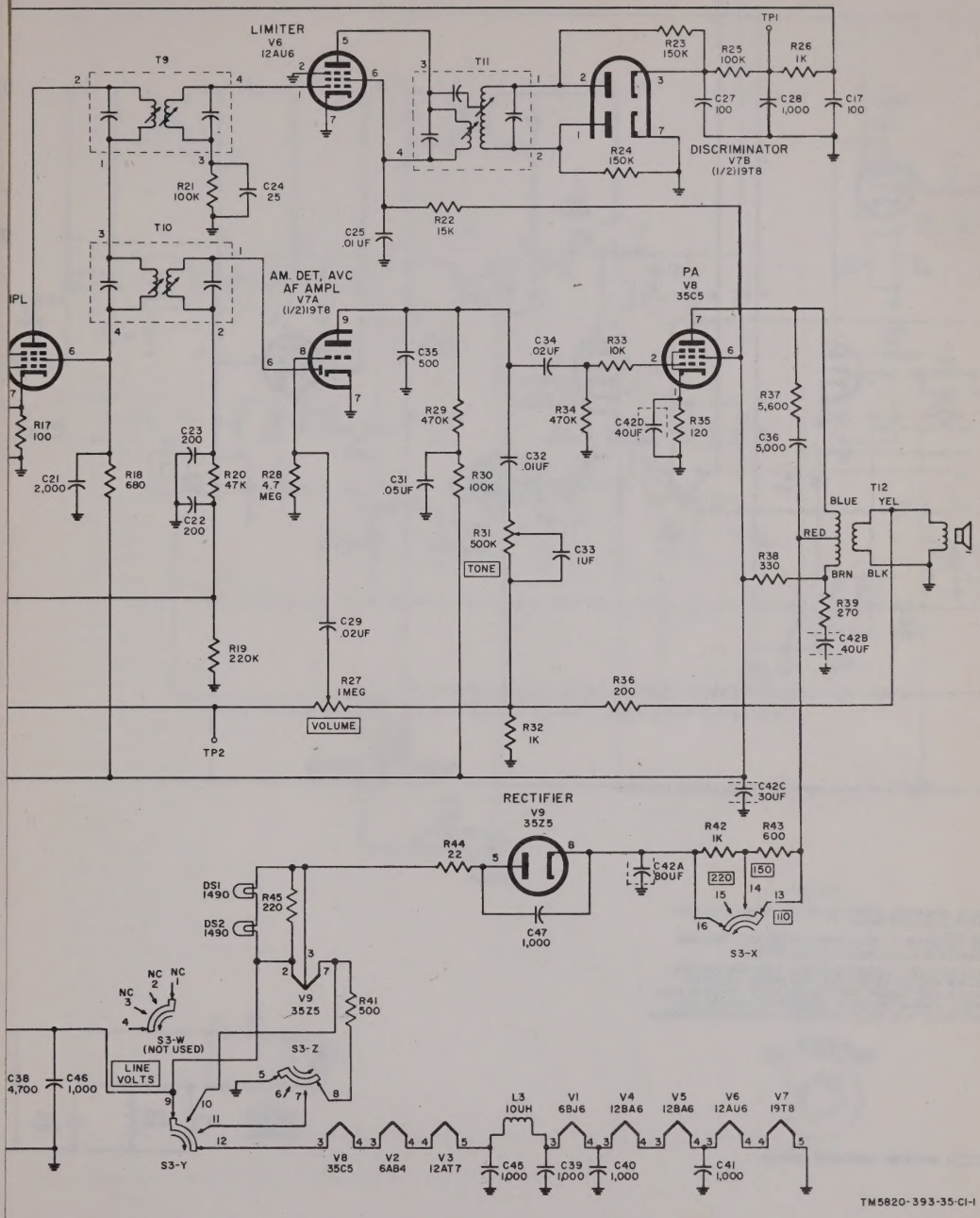

Figure 13. (Superseded) Receiver, Radio R-853/URR, Overall Schematic Diagram

Page 30. Add the following to the appendix: TM 38-750 The Army Equipment Record System and Procedures.

Figure 13. (Superseded) Receiver, Radio R-853/URR, overall schematic diagram
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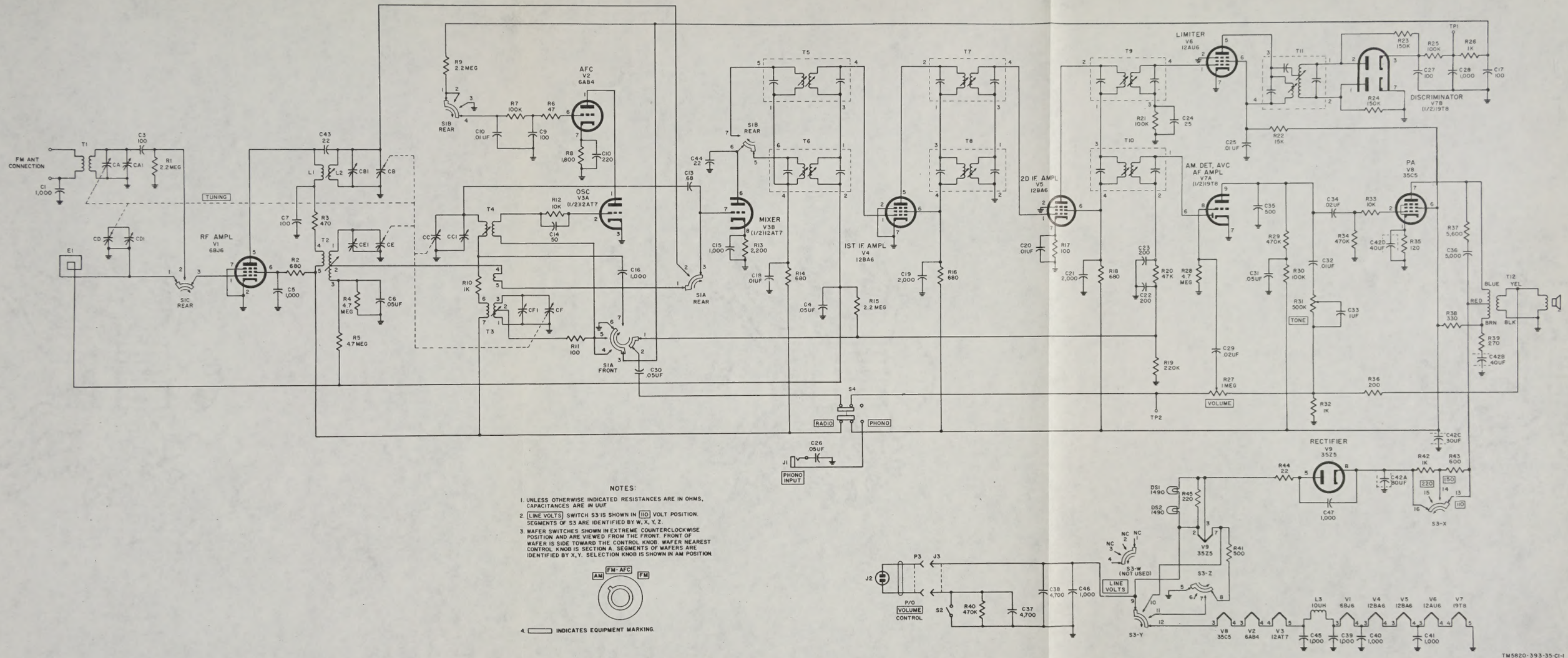

NOTES:

1. UNLESS OTHERWISE INDICATED RESISTANCES ARE IN OHMS, CAPACITANCES ARE IN UUF.
2. LINE VOLTS SWITCH S3 IS SHOWN IN 110 VOLT POSITION. SEGMENTS OF S3 ARE IDENTIFIED BY W, X, Y, Z.
3. WAFER SWITCHES SHOWN IN EXTREME COUNTERCLOCKWISE POSITION AND ARE VIEWED FROM THE FRONT. FRONT OF WAFER IS SIDE TOWARD THE CONTROL KNOB. WAFER NEAREST CONTROL KNOB IS SECTION A. SEGMENTS OF WAFERS ARE IDENTIFIED BY X, Y. SELECTION KNOB IS SHOWN IN AM POSITION.

4. ▭ INDICATES EQUIPMENT MARKING.

Figure 13. (Superseded) Receiver, Radio R-853/URR, Overall Schematic Diagram

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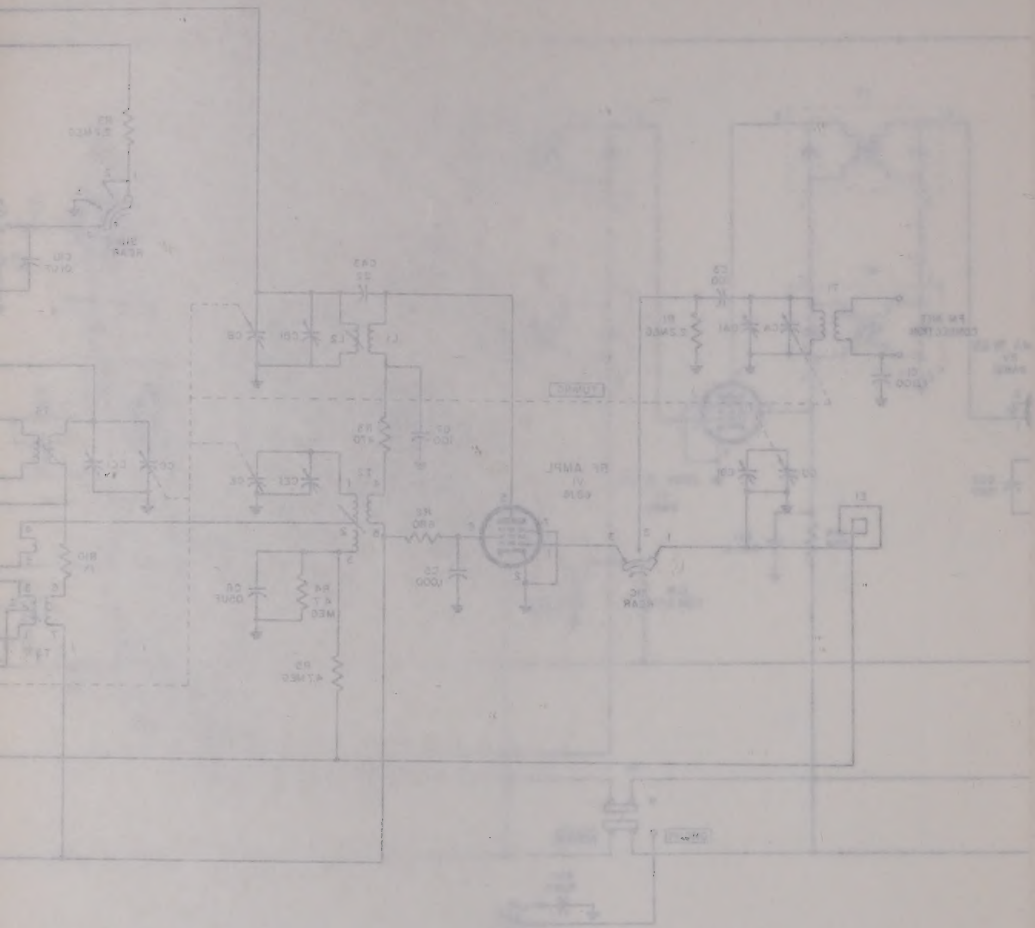

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TECHNICAL MANUAL
No. 11-5820-393-35

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *25 January 1961*

RECEIVER, RADIO R-853/URR

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CHAPTER 1

THEORY

1. Scope

a. This manual covers field and depot maintenance for Receiver, Radio R–853/URR. It includes instructions appropriate to third, fourth, and fifth echelons for troubleshooting, testing, aligning, and repairing the equipment, and includes instructions for replacing specified maintenance parts. It also lists tools, materials, and test equipment for third, fourth, and fifth echelon maintenance.

b. The complete technical manual for this equipment includes three other publications: TM 11–5820–393–12, TM 11–5820–393–20P, and TM 11–5820–393–35P.

c. Forward comments concerning this manual to the Commanding Officer, U. S. Army Signal Materiel Support Agency, ATTN: SIGMS–PA2d, Fort Monmouth, N. J.

Note. For applicable forms and records, see paragraph 2, TM 11–5820–393–12.

2. Block Diagram
(fig. 1)

Receiver, Radio R–853/URR is a nine-tube superheterodyne receiver that provides amplitude modulation (am.) or frequency modulation (fm) reception in the 535- to 1620-kilocycle (kc) am. and 88- to 108 megacycle (mc) fm broadcast bands. Signal paths shown in the block diagram (fig. 1) are discussed in *a* and *b* below. For complete circuit details, refer to the overall schematic diagram (fig. 13).

a. Am. Operation. Signals from the am. antenna are selected by a switch and are applied to radiofrequency (rf) amplifier VI. The amplified output of this stage is coupled to mixer V3. The gain of the rf amplifire, mixer, and first intermediate frequency (if.) am plifier is controlled, particularly at high-signal input levels, by an automatic volume control (avc) voltage fed back from the detector output. The mixer V3B combines the output of the oscillator V3A with the output of rf amplifier V1 to produce an if. of 455 kc. Oscillator V3A produces a frequency which is 455 kc above the input rf signal. The if. is amplified by first and second if. amplifiers V4 and V5. The amplified if. signal is applied to the detector and first audio amplifier V7A. The detector section of V7A demodulates the if. signal, and the resultant audio signal is amplified by the amplifier section of V7A. The audio output is coupled to power amplifer V8 for power amplification to drive the loudspeaker. Direct-current (dc) operating voltages for the receiver are developed by rectifier V9.

b. Fm or Fm-Afc Operation. Signals from the antenna circuit of the receiver are applied to rf amplified V1. The amplified output of this stage is coupled to mixer V3B. The mixer stage combines the output of oscillator V3A with the amplified output of rf amplifier V1 to produce an if. of 10.7 mc. The oscillator produces a frequency which is 10.7 mc above the input rf signal. The if. of 10.7 mc is amplified by first and second if. amplifiers V4 and V5. The amplified if. signal is applied to limiter V6, which eliminates any amplitude variations of the input signal. Discriminator V7B demodulates the if. signal, and the resultant audio signal is coupled to the amplifier section of V7A. The audio output is coupled to power amplifier V8 for power amplification to drive the loudspeaker. In fm-afc operation of the receiver, if the oscillator has drifted, a voltage developed in the discriminator circuit is fed back to automatic frequency control (afc) stage V2. The afc circuit will inject the proper reactance into the oscillator circuit to bring it back on frequency. Dc operating voltages are supplied by rectifier V9.

3. Antenna Circuits
(fig. 13)

a. Am. Operation. With AM—FM–AFC—FM switch S1 is in the AM position, the input

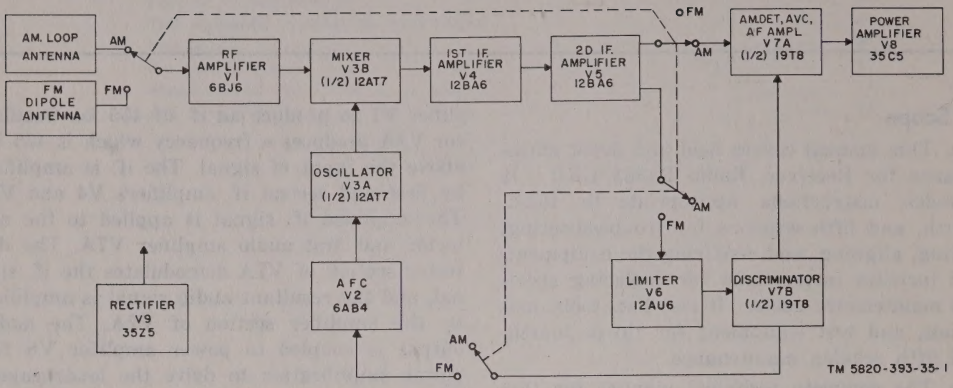


Figure 1. Block diagram

rf signal is developed across the tuned circuit consisting of loop antenna EL and tuning capacitor CD. Trimmer capacitor CD1 shunts the tuned circuit and provides the tuned circuit with an alignment adjustment. Capacitor C4 is an avc filter capacitor. The input rf signal is applied through contacts 1 and 3 of switch S1C rear to the grid (pin 1) of rf amplifier V1.

b. Fm or Fm-Afc Operation. With switch S1 in the FM or FM-AFC position, the input rf signal is developed across the tuned circuit composed of the secondary of transformer T1 and tuning capacitor CA. Trimmer capacitor CA1 shunts the tuned circuit, providing an alignment adjustment. Capacitor C1 puts one side of the fm antenna at ground potential. The input rf signal is coupled through capacitor C3 and contacts 2 and 3 of switch S1C rear to the grid (pin 1) of the rf amplifier.

4. Rf Amplifier V1
(fig. 13)

The Rf amplifier stage V1 uses a type 6BJ6 pentode tube to amplify the low-level signals developed in the antenna circuit. Resistor R3 and capacitor C7 decouple the plate circuit at fm frequencies. Resistor R2 is the screen-dropping resistor, bypassed by C5. Plate voltage from the power supply is applied through the primary of T2, R3, and L1.

a. Am. Operation. With selector switch S1 in the AM position, the plate circuit is tuned by the resonant circuit composed of the secondary of transformer T2 and tuning capacitor CE. The inductance of T2 is adjustable to aid in tracking at the low end of the frequency range, Trimmer capacitor CE1 shunts the resonant circuit for alignment at the high end of the frequency range. The output is coupled through the center tap of the secondary of T2, through windings 4 and 5 of transformer T3, through contacts 1 and 3 of switch S1A rear, to the grid (pin 7) of the mixer (V3B).

b. Fm or Fm-Afc Operation. With selector switch S1 in the FM or FM–AFC position, the plate circuit is tuned by the network that consists of L1, L2, and CB. Inductor L2 is adjustable to aid in tracking at the low end of the frequency range. Capacitor CB1 shunts capacitor CB for alignment at the high end of the frequency range. Capacitor C43 improves the frequency response of the amplifier by compensating for coupling losses at the high end of the band. The output is coupled from L2 through contacts 2 and 3 of switch S1A rear to the grid of the mixer. Resistor R1 provides contact bias for the amplifier.

5. Oscillator V3A

(fig. 13)

a. Am. Operation. Oscillator V3A is a conventional tuned-grid oscillator (Armstrong) with the grid connection on the coil tapped down to improve oscillator stability. The tuned circuit consisting of transformer T3 secondary and tuning capacitor CF determine the frequency of oscillation. Capacitor CF1 shunts CF for alignment at the high end of the frequency range. Grid leak bias is developed across R12 and C14. Resistor R11 is used to prevent spurious oscillations of the oscillator. The B+ voltage is applied through the primary (tickler winding) of T3, decoupling resistor R10, and the tuned primary circuit of T4, to the plate (pin 1). The oscillator output across the output windings (terminals 4 and 5) is coupled to the grid (pin 7) of mixer V3B together with the amplified rf signal from transformer T2.

b. Fm or Fm-Afc Operation. The fm oscillator is tuned by the parallel-resonant circuit consisting of the coil inductance in T4 and the CC section of the main tuning capacitor. Capacitor CC1 shunts CC for alignment at the high end of the frequency range. Tracking of the oscillator at the low end of the frequency range is accomplished by varying the inductance of T4. Grid-leak bias is developed by R12 and C14. Resistor R10 is a decoupling resistor and is bypassed by capacitor C16. The oscillator output is coupled through C13 to the grid of the mixer.

6. Mixer V3B

(fig. 13)

The output of oscillator V3A, and the signal voltage from rf amplifier V1, are applied to the control grid (pin 7). The tube uses cathode bias developed across R13, which is bypassed by C15. Resistor R14 and C18 form a decoupling network in the plate circuit. The tuned plate circuit (am. operation) consists of T6 and C44 and is resonant at 455 kc. Alignment of the circuit is accomplished by adjusting the inductances of T6. During fm or fm-afc operation of the receiver, the tuned plate circuit consists of T5 and C44 and is resonant to 10.7 mc. The output of the mixer stage is inductively coupled through the respective transformer to the input of first if. amplifier V4.

7. First If. Amplifier V4

(fig. 13)

First if. amplifier stage V4 uses a type 12BA6 pentode tube as a voltage amplifier of the 455 kc (am.) or 10.7 mc (fm) signals. Resistor R16 and C19 are a decoupling network for the screen grid and plate circuits. In am. operation, tuned plate circuit, T8 is resonant to 455 kc; in fm operation, T7 is resonant to 10.7 mc. Alignment adjustment of the tuned circuits is accomplished by adjusting the primary and secondary inductance of the respective transformers. The output of the first if. amplifier stage developed across the primary tuned circuit is inductively coupled to the secondary tuned circuits, and applied to the grid of second if. amplifier V5.

8. Second If. Amplifier V5

(fig. 13)

Second if. amplifier stage V5 is similar in operation to first if. amplifier V4. Resistor R18 and capacitor C21 are a decoupling network for the plate and screen grid circuits. The tube uses cathode bias developed across R17, which is bypassed by C20. In am. operation, tuned plate circuit, T10 is resonant to 455 kc; in fm operation, T9 is resonant to 10.7 mc. Alignment of the tuned circuits is accomplished by adjusting the primary and secondary inductance of the respective transformers. The output voltage (fm operation) is inductively coupled to the secondary of T9 and applied to the grid (pin 1) of limiter V6. In am. operation, the output voltage is inductively coupled to the secondary of T10 and applied to the am. detector section of V7A.

9. Limiter V6

(fig. 13)

Limiter stage V6, provides further amplification of the fm if. signal and eliminates any amplitude variations. The grid circuit is tuned to resonate at 10.7 mc by the secondary of T9. Grid-leak bias is developed across R21 and C24. Voltage-dropping resistor R22 and C25 form a decoupling network for the screen grid and plate circuits.

10. Discriminator V7B
(fig. 13)

Discriminator stage V7B used in fm or fm-afc operation, uses two diodes in a triple-diode high-gain triode tube type 19T8 to produce a dc voltage that is proportional to the frequency of the input signal. The polarity of the voltage produced depends on whether the frequency is higher or lower than the frequency to which the discriminator is tuned. The if. signal (10.7 mc) is applied to transformer T11 from the limiter stage. The primary and secondary windings of T11 are tuned to 10.7 mc. When the applied signal is at the center frequency, the current flow through both sections of the tube and the voltage drops across load resistors R23 and R24 are equal and opposite in polarity. When the incoming signal varies above and below 10.7 mc, one section of the tube conducts more than the other thus, providing a larger voltage drop across its load resistor (for a complete discussion of discriminator action see TM 11–668) The direction in which the frequency varies determines which section of the tube conducts more. The resultant output of this circuit is a voltage whose magnitude and frequency are determined by the frequency deviations of the input to the stage. Resistors R25 and R26 and capacitors C17, C27 and C28 form a deemphasis network. The output is coupled through switch S1A front, coupling capacitor C30, volume control R27, and C29 to the grid (pin 8) of the audio amplifier.

11. Afc Stage V2
(fig. 13)

Afc stage V2 used in fm-afc operation, is a reactance modulator used to keep the oscillator, V3A from drifting. A dc voltage is produced at the discriminator output if the input signal is not exactly in tune with the center frequency. The voltage is positive or negative, depending on whether the frequency is high or low. Such a condition takes place if the local oscillator drifts slightly. This in turn changes the relative value of the if., and appears as an off-center frequency in the if. amplifiers and the discriminator. The dc voltage produced by the discriminator is applied to the grid (pin 6) of afc tube V2, and changes the effective transconductance of the tube. The amount of reactance injected into the tuned circuit then changes, varying the oscillator frequency in such a direction as to cancel out the drift which started the process. The response of the system must be sufficiently slow so that variations in carrier frequency caused by modulation are not followed. Therefore, a long time-constant is necessary in the network that feeds the control voltage to the grid. Resistor R9 and capacitor C10 provide a long time-constant network. In this way, only slow variations in the average frequency operate the afc circuit. Resistors R6 and R7 and capacitor C9 form an rf filter network. Cathode bias for the tube is developed across R8 and bypassed by C11.

12. Am. Detector, Avc and Af Amplifier V7A
(fig. 13)

The am. detector, avc, and af amplifier stage V7A is part of a triple-diode high-gain triode tube type 19T8. It acts as an am. signal detector and the first stage of audio amplification. The 455-kc modulated if. signal is rectified by the diode portion of the tube (pin 6), and filtered by the rf filter network that consists of resistors R19 and R20 and capacitors C22 and C23. The dc component of the demodulated signal is fed back through the filter consisting of resistor R15 and capacitor C4 to the grids of the rf amplifier (V1), the mixer (V3B), and the first if. amplifier (V4) to automatically control the gain of these stages. Resistor R15 and capacitor C4 serve as a filter to reduce the modulation effect of the incoming signal so that a constant avc voltage can be supplied. The audio portion of the signal is coupled through switch S1A front, coupling capacitor C30, and across volume control R27. The desired signal level is coupled through C29 to the grid (pin 8) of V7A, where it is further amplified. The tone control network in the plate circuit consists of C32, C33, and potentiometer R31. Resistors R36 and R32 form a voltage divider network for negative feedback to the grid of the power amplifier for better fidelity of the output. The audio output is coupled through coupling capacitor C34 to the grid (pin 2) of the power amplifier.

13. Power Amplifier V8
(fig. 13)

The power amplifier stage V8 amplifies the audio output signal to a level high enough to drive the loudspeaker. Cathode bias is developed across R35 and bypassed by C42D. Resistor R33 prevents the grid from drawing current on large input signals. Capacitor C36 and R37 are shunted across the primary of T12 to improve frequency response. Capacitors C42A, B, C, and resistors R38 and R39 form a filter network.

14. Power Supply
(fig. 13)

The receiver incorporates a power supply which operates on 110, 150, or 220 volts alternating current (ac) or dc. It supplies all voltages required for the operation of the receiver. The power supply circuit is completed through safety interlock P3 and J3 which removes the input voltage from the receiver when the back panel is removed, and through on-off switch S2 when it is in the closed position. Switch S2 is mounted on the VOLUME control. Capacitors C37, C38, C46, and resistor R40 filter rf interference from the line.

a. 110-Volt Operation. With LINE VOLTS selector switch S3 in the 110 position, voltage is applied through contacts 9 and 12 of LINE VOLTS switch S3 to the filaments of tubes V1 through V8 and then to ground. Capacitors C39, C40, C41, C45 and rf choke L3 provide rf filtering in the filament circuit. The 110-volt input is also applied through contacts 1 and 4 of switch S3, through voltage- dropping resistor R41, to the filament of V9, and indicator lamps DS1 and DS2 through contacts 5 and 8 of S3 to ground. Current flow through the lamps is limited by parallel-connected resistor R45. The line voltage is rectified by half-wave rectifier V9. Resistor R44 is a current surge limiting resistor. Voltage-dropping resistors R42 and R43 are shorted by contacts 13 and 16 of switch S3. The rectified voltage is filtered by capacitors C42A, C42B, and C42C; resistors R38 and R39, and part of the primary of output transformer T12. Capacitor C47 together with surge limiting resistor R44 prevents shock excited ringing within rectifier tube V9.

b. 150-Volt Operation. With LINE VOLTS selector switch S3 in the 150 position, the input voltage is applied through contacts 2 and 4 of switch S3, voltage-dropping resistor R41, filament of V9, indicator lamps DS1 and DS2, through contacts 6, 8, 10, and 12 of switch S3, and the filaments of V1 through V8 to ground. Voltage-dropping resistor R43 is in series with rectifier V9. Resistor R42 is shorted through contacts 14 and 16 of switch S3.

c. 220-Volt Operation. With LINE VOLTS selector switch S3 in the 220 position, the input voltage is applied through contacts 3 and 4 of S3, voltage-dropping resistor R41, filament of V9, indicator lamps DS1 and DS2, contacts 7, 8, 11, and 12 of S3, and the filaments of V1 through V8 to ground. Voltage-dropping resistors R42 and R43 are in series with rectifier V9.

CHAPTER 2

TROUBLESHOOTING

CAUTION: Be extremely careful when setting the LINE VOLTS selector switch. Be certain that the switch setting is correct for the available line voltage.

15. General Troubleshooting Instructions

Troubleshooting at field and depot maintenance level includes all the techniques outlined for organizational maintenance and any special or additional techniques required to isolate a defective part. The field and depot maintenance procedures are not complete in themselves but supplement the procedures described in the organizational maintenance manual. The systematic troubleshooting procedure, which begins with the operational and sectionalization checks that can be performed at an organizational level, must be completed by means of localizing and isolating techniques.

16. Troubleshooting Procedures

a. General The first step in servicing a defective radio receiver is to localize the fault. Localization means tracing the fault to a circuit responsible for abnormal operation. The second step is to isolate the fault. Isolation means tracing the fault to a defective part responsible for the abnormal condition. Some faults, such as burned-out resistors, and arcing and shorted transformers can often be located by sight, smell, and hearing. The majority of faults, however, must be isolated by checking voltages and resistances.

b. Localization. The tests listed below will aid in locating the trouble to a single stage or circuit.

(1) *Troubleshooting chart.* The troubleshooting chart (para 19) presents a systematic method of locating malfunctioning circuits.

(2) *Signal substitution.* Signal substitution charts (para 21), when used in conjunction with the troubleshooting chart, provide a method of localizing trouble to a stage.

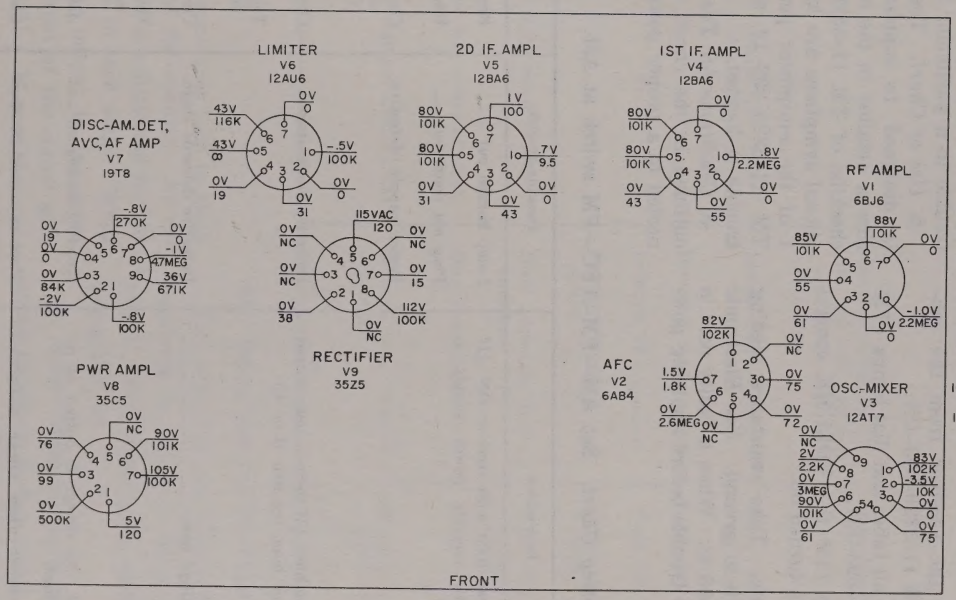
c. Isolation. The defective component is usually located by voltage and resistance measurements. The voltage and resistance chart (fig. 2) will aid in locating the defective component. The resistor and capacitor color codes are given in figures 8 and 9.

Note. In all these tests, the possibility of intermittent troubles should not be overlooked. If present, this type of trouble often may be made to appear by tapping the components.

17. Test Equipment Required

The following chart lists test equipment required for troubleshooting Receiver, Radio R–853/URR. The associated technical manuals and the assigned common names are also listed.

Test equipment	Technical manual	Common name
Rf Signal Generator AN/URM–25F	TM 11–5551–E	Rf signal generator
Audio Oscillator TS–382A/U	TM 11–2684	Audio oscillator
Test Set, Electron Tube TV–7/U	TM 11–6625–274–12	Tube tester
Electronic Multimeter TS–505/U	TM 11–5511	Vtvm
Signal Generator AN/URM–70	TM 11–1258	Fm signal generator



NOTES:

1. INPUT 117 VAC 60 CPS
2. VOLUME CONTROL SWITCH TURNED ON MAXIMUM FOR ALL VOLTAGE READINGS. NO RF SIGNAL IS TO BE APPLIED FOR VOLTAGE MEASUREMENTS.
3. VOLUME CONTROL SWITCH TURNED OFF FOR ALL RESISTANCE READINGS.
4. CHECK AC VOLTAGE BETWEEN CHASSIS AND BENCH GROUND-IF THERE IS ANY INDICATION OF VOLTAGE-REVERSE PLUG BEFORE HANDLING THE SET. MEASURED VALUES ARE FROM SOCKET PIN TO COMMON NEGATIVE.
5. WITH FM, FM-AFC, STD-B'CST SWITCH IN STD-B'CST POSITION, TEST THE FOLLOWING TUBES: V1, V3, V4, V5, PINS 6, 7, 8, AND 9 ON V7, AND V8.
6. WITH FM, FM-AFC, STD-B'CST SWITCH IN FM-AFC POSITION, TEST THE FOLLOWING TUBES: PINS 1, 2, 3, 4, AND 5 ON V7, V2, V3
7. WITH FM, FM-AFC, STD-B'CST SWITCH IN FM POSITION TEST THE FOLLOWING TUBES: V1, V3, V4, V5, V6 PINS 1, 2, 3, 4, AND 5 ON V7, AND V8.
8. MEASUREMENTS MADE WITH MULTIMETER AN/URM 105 OR EQUIVALENT.
9. NC INDICATES NO CONNECTION
10. VOLTAGE READINGS ABOVE LINE, RESISTANCE READINGS BELOW LINE.
11. NOMINAL TOLERANCES ON COMPONENT VALUES ALLOW A VARIATION OF ± 15% IN VOLTAGE AND RESISTANCE READINGS.

TM 5820-393-35-19

Figure 2. Receiver, Radio R853/URR, voltage and resistance measurements.

CAUTION: Do not attempt removal or replacement of parts before reading the instructions in paragraph 24.

18. Checking Filament and B+ Circuits for Shorts

a. When to Check. When abnormal symptoms reported from operational test given in TM 11–5820–393–12 indicate possible power supply troubles, check for short circuits and clear the troubles before applying power.

b. Conditions for Test. To prepare for the short circuit test, perform the following steps:

(1) Remove the receiver from the cabinet (TM 11–5820–393–12).

(2) Remove all tubes and dial lamps (TM 11–5820–393–12).

(3) Be sure that the VOLUME control switch is turned off.

c. Measurements. Take resistance reading from pin 8 of V9 to ground. Use Electronic Multimeter TS–505/U. When a faulty part is found, repair the trouble before applying power to the unit.

19. Localizing Troubles

a. General. Procedures for localizing trouble to the af, if., and rf sections of the receiver, and for localizing troubles to a stage within the various sections, are given in the troubleshooting chart (*d*) below). Parts locations are indicated in figures 3, 4①, 4②, and 5. Depending on the nature of the operational symptoms, one or more of the localizing procedures will be necessary. When use of the procedures results in localization of trouble to a particular stage, use the techniques outlined in paragraph 22 to isolate the trouble to a particular part.

b. Use of Chart. The troubleshooting chart is designed to supplement the operational checks detailed in the equipment performance checklist of TM 11–5820–393–12. If no operational symptoms are known, begin with item 1 of the equipment performance checklist in TM 11–5820–393–12 and proceed until the trouble is located.

c. Conditions for Tests. Conduct all checks outlined in the chart with the receiver connected to a proper power source.

d. Troubleshooting Chart. Set AM—FM–AFC—FM switch at AM.

Item	Indications	Possible trouble	Procedure
1	Lamp does not light with receiver ON. (If lamp lights, receiver power supply is operating.)	Lamp burned out ------	Replace lamp.
		Plug not connected ----	Insert plug into receptacle.
		Power supply defective.	Check V9. Take voltage and resistance measurements on V9 (fig. 2).
2	No output, no hum. (If there is some output and/or some hum, see item 3 or 4.)	Defective audio stage --	Check V8.
			Take voltage and resistance measurements on V8 (fig. 2).
3	No output, slight hum ----------	Defective detector stage.	Check V7.
			Take voltage and resistance measurements on V7 (fig. 2).
4	Weak output. No change in output as receiver is tuned.	Receiver misaligned ----	Align receiver (para 27).
5	No signal output when 455-kc modulated signal is applied to pin 1 of V4.	First or second if. stage defective.	Check V4 and V5.
			Take voltage and resistance

Item	Indications	Possible trouble	Procedure
			measurements on V4 and V5 (fig. 2).
			Make signal substitution tests (para 21).
6	Rushing noise but no signal ----------	Rf or oscillator stage defective.	Check tubes V1 and V3 with tube tester, or by substitution.
			Take voltage and resistance measurements on V1 and V3 (fig. 15).
			Make signal substitution test (para 21).
		Function switch in FM or FM–AFC position and receiver not tuned on station.	Tune receiver.
7	Noise peaks are not reduced with receiver function switch set to FM or FM–AFC.	Defective R21 or C24 ---	Check R21 and C24 (fig. 4 ① and 4 ②).
		Defective limiter stage	Check V6.
		Defective T9 ----------	Check T9 (fig. 5).
		Defective function switch.	Check continuity of function switch.
8	Receiver noisy while being tuned to different stations.	Dirty plates in tuning capacitor.	Clean between plates of ganged capacitors.
9	Receiver noisy when AM—FM–AFC—FM switch is operated.	Dirty contacts on switch.	Clean contacts of S1.
10	Reception weak or intermittent ----------	Antenna not properly connected.	Examine antenna connections to make sure the connections are secure.

20. Signal Substitution

Signal substitution procedures help to localize troubles to a stage of the receiver. An externally generated signal is substituted for the signal normally present in each stage. When working back from the output to the input stages, decrease the output of the signal generator as much as possible. If possible, compare results with a receiver known to be in good operating condition.

21. Signal Substitution Charts

The charts in *a* through *f* below will aid in localizing trouble to a faulty stage of the receiver. Test equipment required is listed in paragraph 17.

a. Audio Stage. Connect the output of the audio oscillator to the points indicated. The receiver loudspeaker will act as an indication of volume and tone.

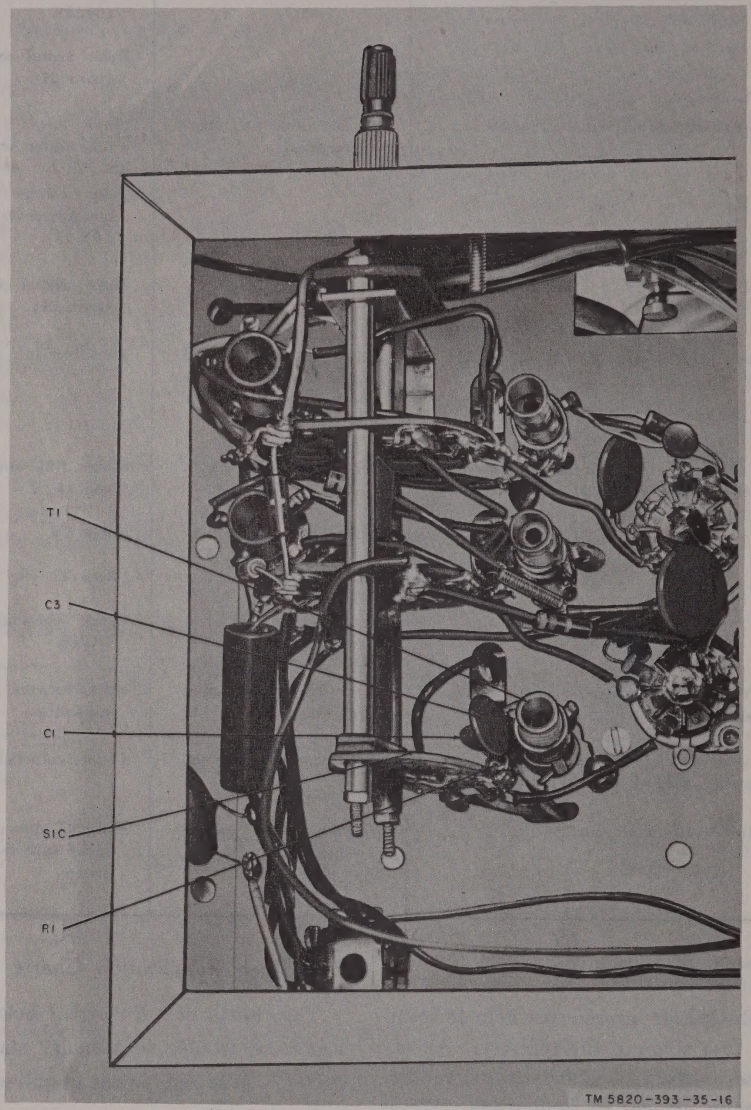


Figure 3. Rf section, shield removed.

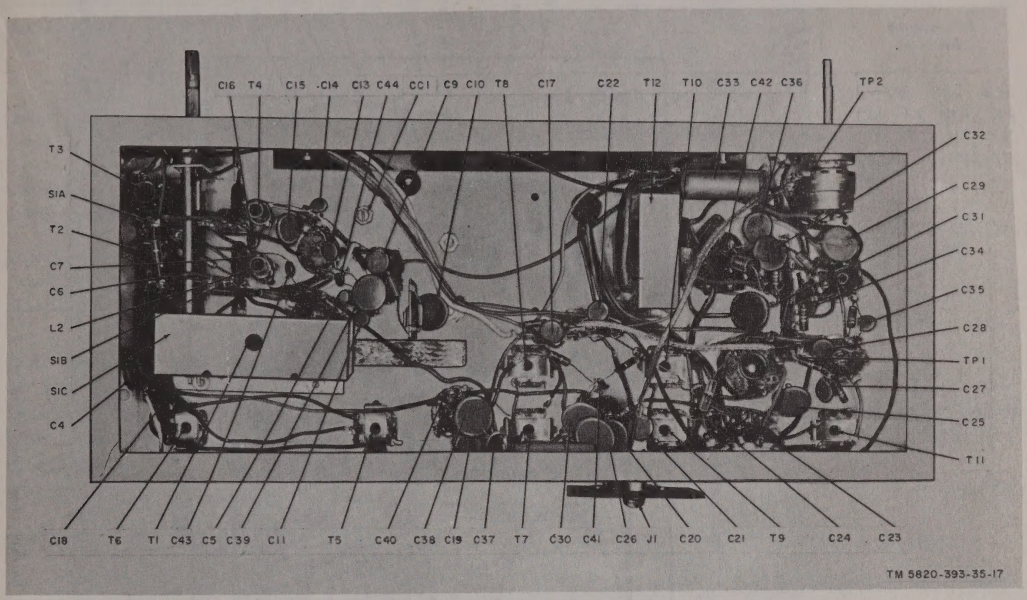


Figure 4 ①. Receiver chassis, bottom view (part 1 of 2).

Signal frequency (cps)	Connection to	Component to check
400	Pin 2, V8	V8, T12, loudspeaker, R33, R34 R35, R37, R38, R39, C42B, C42C, C42D
400	Pin 9, V7	C34
400	Pin 8, V7	V7, R28, R29, R30, C31
400	R27 side of C29	C29
400	S1A front side of C30	R27, S4, C30
400	Pin 3, V7	R25, R26, S1A front, C27, C28

b. If. Stage, Am. Check. Connect the output of the rf signal generator to the points indicated. Set the AM—FM–AFC—FM switch at AM. The receiver loudspeaker will act as an indication of volume and tone.

Signal Frequency	Connection to	Component to check
455-kc, 400-cps mod	Pin 1, V5	V5, T9, T10, R17, C20, R18, C21
455-kc, 400-cps mod	Pin 1, V4	V4, T7, T8, R16, T19
455-kc, 400-cps mod	Pin 7, V3	V3, C44, SIB rear, T6, R14, C18, S4, T5, R15, R19, R13, C15

c. Rf Stage, Am. Check. Connect the output of the rf signal generator to the points indicated. The receiver loudspeaker will act as an indication of volume and tone.

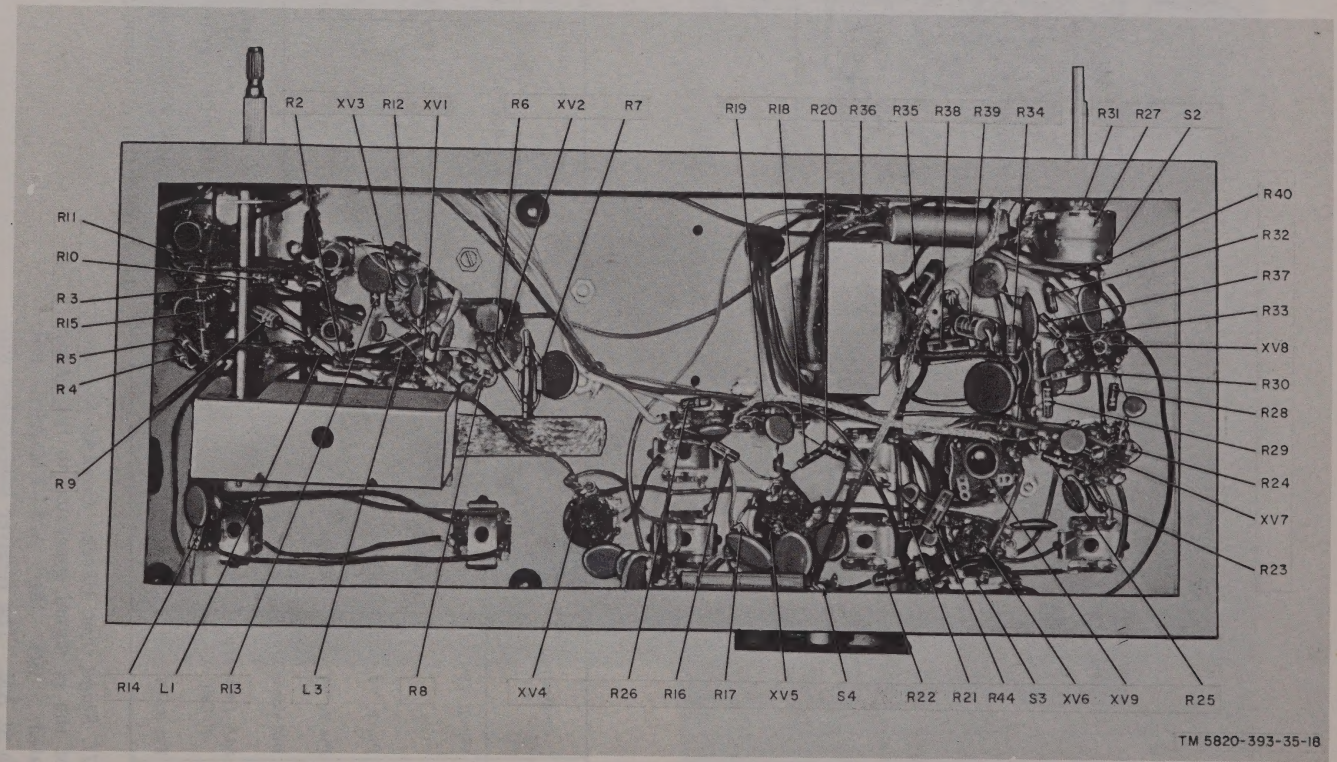


Figure 4 ②. Receiver chassis, bottom view (part 2 of 2).

Signal Frequency	Connection to	Component to check
1,000-kc, 400-cps mod	Pin 7, V3	C13, R12, C14, T4, R11, T3, CF, CF1, S1A rear
1,000-kc, 400-cps mod	Pin 5, V1	L1, C7, R3, T2, R4, C6, R5
1,000-kc, 400-cps mod	Pin 1, V1	V1, C5, R2
1,000-kc, 400-cps mod	AM antenna	E1, S1C rear, CD, CD1

d. Limiter Stage. Connect the output of the rf signal generator to the points indicated. Connect the vtvm across one discriminator load resistor R23. The vtvm will act as an indication of output. Set the AM—FM–AFC—FM switch at FM.

Signal Frequency	Connection to	Component to check
10.7-mc unmodulated	Pin 1, V6	V6, T11, V7, R23, R24, R21, C24, C25, R22, R26, C30, S4

e. If. Stage, Fm Check. Connect the output of the rf signal generator to the points indicated. Connect the vtvm to the control grid (pin 1) of limiter stage V6, and ground.

Signal Frequency	Connection to	Component to check
10.7-mc unmodulated	Pin 1, V5	V5, T9, T10, R17, R18, C20, C21
10.7-mc unmodulated	Pin 1, V4	V4, T7, T8, R16, C19
10.7-mc unmodulated	Pin 7, V3	C44, SIB rear, V3, R13, C15, T5, R14, C18, S4

f. Rf Stage, Fm Check. Connect the output of the fm signal generator to the points indicated. Set the receiver tuning dial to 98 mc. The receiver loudspeaker will act as an indication of volume and tone.

Signal Frequency	Connection to	Component to check
98-mc, 1,000-cps modulation 150-kc deviation	Pin 7, V3	V2, V3, C13, R12, C14, T4, S1A, R8, C11, R6, R7, CC, CC1, C16, R10, T3, C9
98-mc, 1,000-cps modulation 150-kc deviation	Pin 5, V1	L1, R3, C7, T2, C43, L2, CB, CB1
98-mc, 1,000-cps modulation 150-kc deviation	Pin 1, V1	V1, C5, R2
98-mc, 1,000-cps modulation 150-kc deviation	FM antenna terminals	T1, C1, CA, CA1, C3, R1, S1C rear

22. Isolating Trouble Within a Stage

When trouble has been localized to a stage, either through operational checks or signal substitution (para 21), use the techniques in *a* through *d* below to isolate the defective part.

a. Test the tube involved in a tube tester or by substituting a similar type tube which is known to be operating normally.

b. Take voltage measurements at the tube sockets (fig. 2) and other points related to the stage in question.

c. If voltage readings are abnormal, take resistance readings (fig. 2) to isolate open and short circuits. Refer to the dc resistances of transformers and coils in paragraph 23.

d. If signals are weak, and all checks fail to indicate a defective part, check the alignment of the receiver (para 27).

23. Dc Resistance of Transformers and Coils

The dc resistances of the transformer windings and coils in the receiver are listed in the chart below.

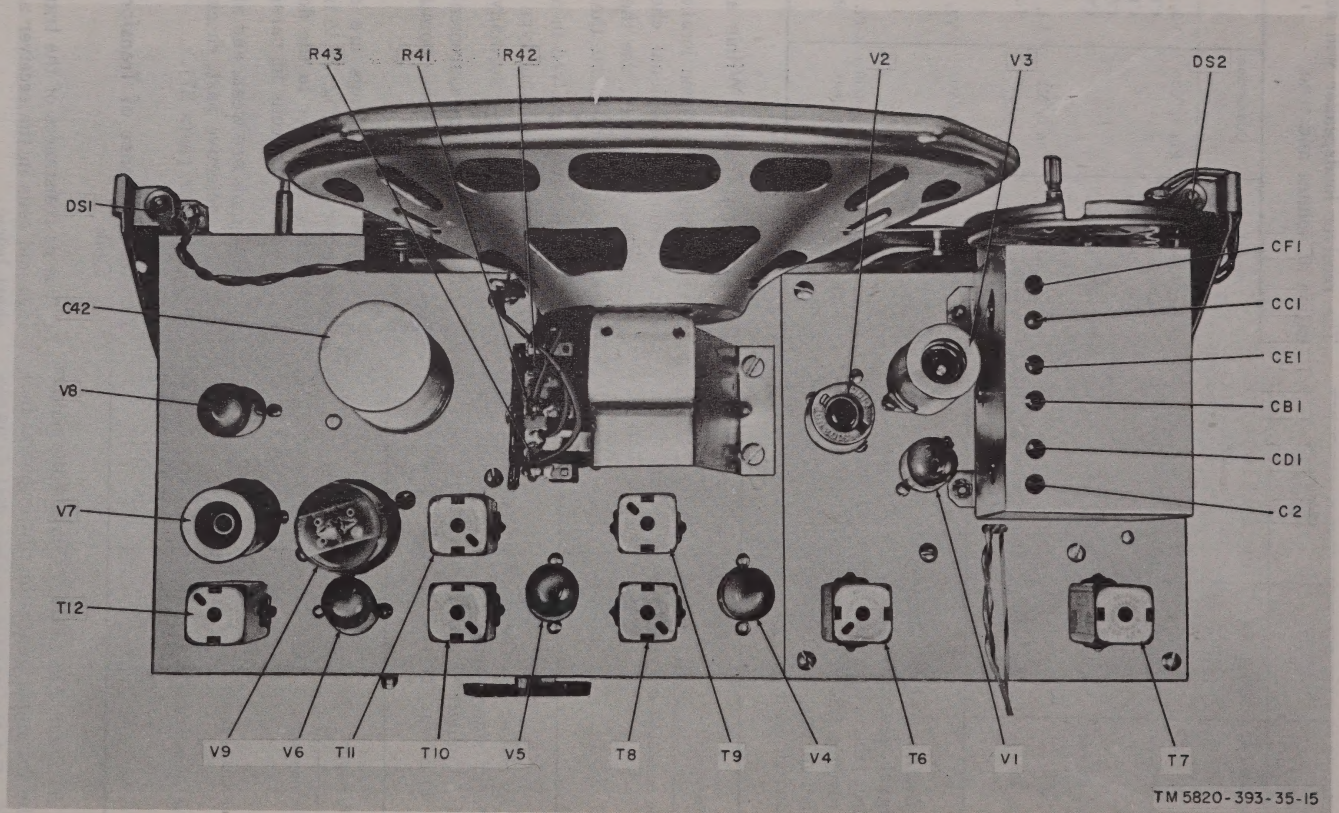


Figure 5. Chassis, top view.

Transformer or coil	Terminals	Resistance (ohms)
T1	Primary	Less than 1
	Secondary	Less than 1
T2	1–2	7.8
	2–3	2.6
	4–5	1.9
T3	1–2	4.2
	2–3	4.8
	4–5	1.4
	6–7	1.8
T4	Primary	Less than 1
	Secondary	Less than 1
T5	1–5	Less than 1
	3–4	Less than 1
T6	1–2	19
	4–6	8.5
T7	1–2	Less than 1
	3–4	Less than 1
T8	1–2	8.5
	3–4	8.5
T9	1–2	Less than 1
	3–4	Less than 1
T10	1–2	10.5
	3–4	10.5
T11	1–2	Less than 1
	3–4	Less than 1
T12	Brown-Red	2.7
	Red-Blue	233
	Yellow-Black	Less than 1

CHAPTER 3

REPAIRS AND ALIGNMENT

Section I. REPAIRS

24. General Parts Replacement Technique

a. To remove the chassis from the receiver case, refer to the instructions in TM 11–5820–393–12.

b. Most of the parts in this receiver can be reached easily and replaced without special procedures. The stringing procedures for the dial indicator cord are contained in paragraph 25.

25. Replacement of Dial Indicator Cord (fig. 6)

a. Fasten the looped end of the string to hook A provided on drum B. The looped end of the string is the one without the spring.

b. Wrap the string partially around drum B as indicated in figure 6. Drum B is provided with a slot for this purpose.

c. Wrap the string completely around the splined sleeve C. Make sure that the string takes a complete turn around this sleeve or the TUNING control will not operate.

d. Run the string to the opposite side of the front chassis and provide a one-half turn around slotted wheel D.

e. Thread the string into the sliding dial pointer E. Observe the string path illustrated in figure 6.

f. Push the string into the slot provided on

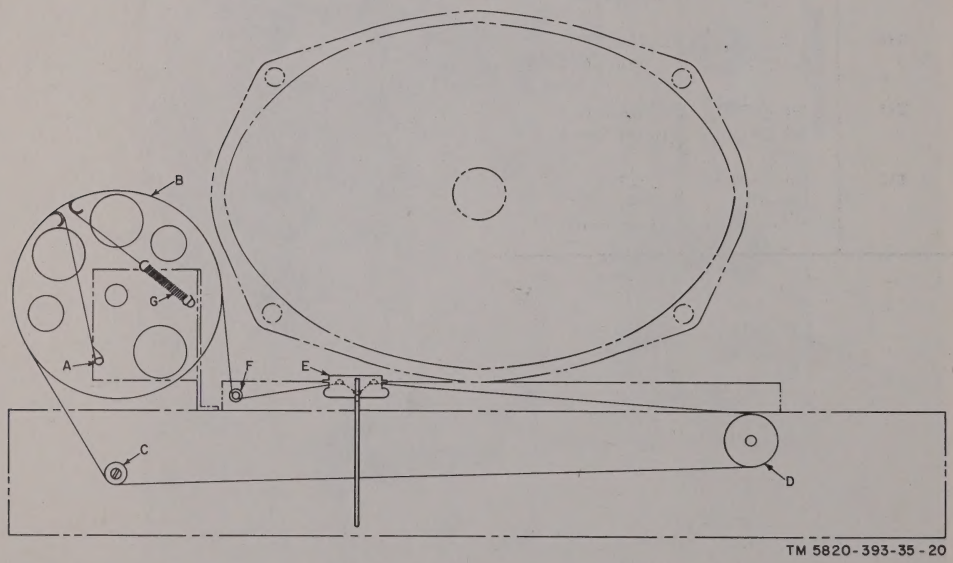


Figure 6. Dial cord stringing.

bushing F. Do not make a complete turn of the string on this bushing.

g. Wrap the string back onto drum B and attach spring G to the hook provided on the drum (fig. 6). The string should be cut short enough to keep the spring tight on the drum.

h. Place TUNING control in full counterclockwise position. Facing the front of the receiver, place the dial pointer 4⅝ inches from the left side of the chassis. This corresponds to the maximum left-hand position of the pointer.

Section II. ALIGNMENT

26. Test Equipment and Special Tools Required for Alignment

Test equipment required is listed in paragraph 17. In addition, an insulated alignment tool is required.

27. Alignment Instructions

Align the receiver in accordance with the instructions in *a* through *c* below. The locations of components, referred to in the alignment charts, are contained in figures 3, 4 ①, 4 ②, and 5. Set the receiver VOLUME control at the maximum clockwise position. The output of the signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment tool for adjusting the transformers and inductors. The antenna should be maintained in the same relative position to the chassis as when the receiver is in the cabinet.

Note. During am. alignment, disable the A.V.C. circuit by shorting capacitor C4.

a. Am. Alignment.

Step No.	Rf signal generator connection	Rf signal generator frequency	AM—FM - AFC—FM switch position	Receiver dial setting	Vtvm connection	Adjust	Remarks
1	High side to pin 1 (grid) of the 12BA6 (V5). Low side to chassis.	455 kc (400-cps mod)	AM	Point of noninterference	Across voice coil of speaker	T10 top and bottom	Adjust for maximum output.
2	High side to pin 1 (grid) of the 12BA6 (V4). Low side to chassis.	445 1c (400-cps mod)	AM	Point of noninterference	Across voice coil of speaker	T8 top and bottom	Adjust for maximum output.
3	High side to pin 7 (grid) of the 12AT7 (V3). Low side to chassis.	445 kc (400-cps mod)	AM	Point of noninterference.	Across voice coil of speaker	T6 top and bottom	Adjust for maximum output.
4	Antenna	1,600 kc	AM	1,600 kc	Across voice coil of speaker	T2	Construct a loop of several turns of wire and radiate signal into antenna of receiver. Adjust for maximum output.
5	Antenna	1,400 kc	AM	1,400 kc	Across voice coil of speaker	CE1, CD1	Use loop as above and adjust for maximum output. Repeat steps 4 and 5.

b. Fm If. Alignment.

Note. Use a 2-megohm isolation resistor in series with the dc probe.

Step No.	Rf signal generator connection	Rf signal generator frequency	AM—FM - AFC—FM switch position	Receiver dial setting	Vtvm connection	Adjust	Remarks
1	High side to pin 1 (grid) of 12AU6 (V6) Low side to chassis.	10.7 mc (unmod)	FM	Point of noninterference	Dc probe to pin 1 (plate) of 19T8 (V7). Low side to chassis.	T11 bottom (primary)	Adjust for maximum deflection.
2	Same as above -------	10.7 mc	FM	Point of	Dc probe to pin 3 (cathode) of	T11 top (secondary)	Adjust for zero reading. A

Step No.	Rf signal generator connection	Rf signal generator frequency	AM—FM - AFC—FM switch position	Receiver dial setting	Vtvm connection	Adjust	Remarks
		(unmod)		noninterference	19T8 (V7). Low side to chassis.		positive and negative reading will be obtained on either side of correct setting.
3	High side to pin 1 (grid) of 12BA6 (V5). Low side to chassis.	10.7 mc (unmod)	FM	Point of noninterference	Dc probe to pin 1 (grid) of 12AU6 (V6). Low side to chassis.	T9 top and bottom	Adjust for maximum deflection.
4	High side to pin 1 (grid) of 12BA6 (V4). Low side to chassis.	10.7 mc (unmod)	FM	Point of noninterference	Same as above ----------	T7 top and bottom	Adjust for maximum deflection.
5	High side to pin 7 (grid) of 12AT7 (V3). Low side to chassis.	10.7 mc (unmod)	FM	Point of noninterference	Same as above ----------	T5 top and bottom	Adjust for maximum deflection. Repeat steps 3, 4, and 5.

c. Fm Rf Alignment.

Note. Use a 2-megohm isolation resistor in series with the dc probe.

Step No.	Fm signal generator connection	Fm signal generator frequency	AM—FM - AFC—FM switch position	Receiver dial setting	Vtvm connection	Adjust	Remarks
1	To FM antenna terminals.	88 mc (unmod)	FM	88 mc	Dc probe to pin 1 (grid) of 12AU6 (V6). Common to chassis.	T4, L2 and T1	Adjust in order given for maximum deflection.
2	To FM antenna terminals.	108 mc	FM	108 mc	Same as above ----------	CC1, CB2, CA1	Adjust in order given for maximum deflection. Repeat steps 1 and 2.

CHAPTER 4

FINAL TESTING

28. Purpose of Final Testing

The tests outlined in this section are designed to measure the performance capability of the repaired receiver. Equipment that meets the minimum standards stated in the tests will furnish satisfactory operation, equivalent to that of a new receiver.

29. Test Equipment Required for Final Testing

In addition to the test equipment listed in paragraph 17, the following items are required for final testing.

a. Pad. The pad must have a voltage ratio of 10 to 1, impedance matching from 50 to 75 ohms, and attenuation of 20 decibels. For construction of the pad, see figure 7.

b. Loop Antenna. GR 1000–P10 or equivalent.

c. Load Impedance. A resistor of 3.2 ohms is required.

30. Test Setup

Most of the tests will be performed under the conditions listed in *a* through *e* below. Testing will be simplified if connections and control settings are made initially and modifications are made as required for the individual tests. The receiver being tested shall be aligned properly prior to performing any of the tests outlined in paragraphs 31 through 33.

a. Remove the receiver from the cabinet.

b. Connect the pad to the receiver and FM signal generator, with the 50-ohm side to the signal generator, and the 75-ohm side to the receiver.

c. Disconnect the yellow lead from the speaker and connect a dummy load of 3.2 ohms between the yellow lead and the black lead on the speaker.

d. Set VOLUME and TONE controls in the maximum clockwise position.

e. Connect the vtvm across the 3.2 dummy load.

31. Fm Sensitivity Test
(fig. 10)

a. Test Equipment and Materials.
Signal Generator AN/URM–70
Electronic Multimeter TS–505/U

b. Test Connections and Conditions. Connect the equipment as shown in figure 10.

c. Procedure.

Step No.	Test equipment control settings	AM—FM - AFC—FM switch position	Test procedure	Performance standard
1	*Signal Generator AN/URM–70* FREQ. RANGE–MC: 50–100 FREQ. IN MEGACYCLES: 98 MODULATION: 1,000 DEV. MULT: XI DEVIATION: Adjust for 22.5-kc reading on KILOCYCLES DEVIATION meter. *Electronic Multimeter TS–505/U* RANGE: 10V FUNCTION: AC	AM—FM–AFC—FM switch: FM–AFC	*a.* Set the generator OUTPUT control for 200 MICRO-VOLTS. *b.* Adjust TUNING control on the receiver (approximately 98 mc) for a maximum reading on the vtvm. *c.* Set the vtvm RANGE switch at 2V. *d.* Adjust the receiver VOLUME control for a reading of 1v on the vtvm. *e.* Set the signal generator MODULATION switch at OFF. The reading on the vtvm should be 0.032 volt or lower.	*a.* None. *b.* None. *c.* None. *d.* None. *e.* Indicates 30-db quieting or better.

32. Signal-to-Noise Ratio Test
(fig. 11)

a. Test Equipment and Materials.
Signal Generator AN/URM–70
Electronic Multimeter TS–505/U

b. Test Connections and Conditions. Connect the equipment as shown in figure 11.

c. Procedure.

Step No.	Test equipment control settings	AM—FM - AFC—FM switch position	Test procedure	Performance standard
1	*Signal Generator AN/URM–70* FREQ. RANGE–MC: 50–100 FREQ. IN MEGACYCLES: 98 MODULATION: 1,000 DEV. MULT: X5 DEVIATION: Adjust for 75-kc reading on KILOCYCLES DEVIATION meter. OUTPUT: 10,000 microvolts *Electronic Multimeter TS–505/U* RANGE: 2V FUNCTION: AC	AM—FM–AFC—FM switch: FM–AFC	*a.* Adjust VOLUME control on receiver to obtain a 1-volt reading on vtvm. *b.* Set the signal generator MODULATION switch at OFF.	*a.* None *b.* A reading of 0.01 volt or less should be obtained.

33. Afc Correction Test
(fig. 12)

a. Test Equipment and Materials.
Signal Generator AN/URM–70
Electronic Multimeter TS–505/U

b. Test Connections and Conditions. Connect the equipment as shown in figure 12.

c. Procedures.

Step	Test equipment control settings	AM—FM - AFC—FM switch position	Test procedure	Performance standard
1	*Signal Generator AN/URM-70* FREQ. RANGE-MC: 50-100 FREQ. IN MEGACYCLES: 98 MODULATION: 1,000 DEV. MULT: XI DEVIATION: Adjust for 22.5-kc reading on KILOCYCLES DEVIATION meter. *Electronic Multimeter TS-505/U* RANGE: 10V FUNCTION: ± DC	AM—FM-AFC—FM switch: FM	*a.* Adjust receiver TUNING control for a positive peak on vtvm. *b.* Slowly tune the receiver lower in frequency until a negative peak is obtained on the vtvm. *c.* Adjust receiver TUNING control for a +5 volts reading on the vtvm. d. AM—FM-AFC—FM switch: FM-AFC	*a.* None. *b.* The positive and negative peaks should be equal in amplitude. *c.* None. *d* Vtvm reading should be 0.9 volt or less. (Corresponds to 15 db.)

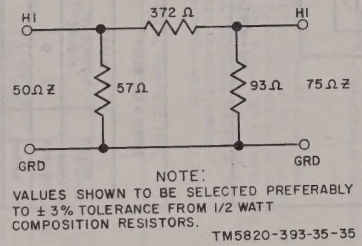
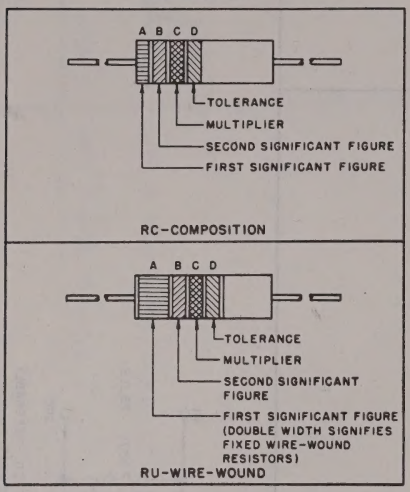


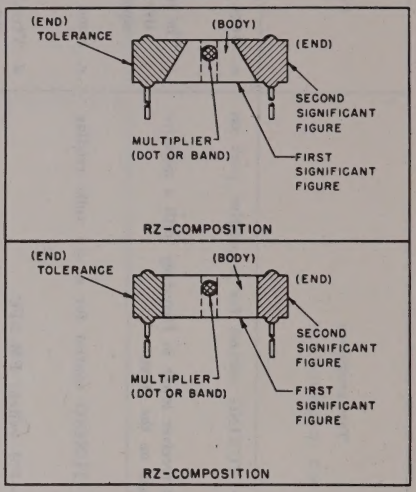
Figure 7. 50- to 75-ohm pad.

RESISTOR COLOR CODE MARKING
(MIL-STD RESISTORS)

AXIAL-LEAD RESISTORS (INSULATED)



RADIAL-LEAD RESISTORS (UNINSULATED)



RESISTOR COLOR CODE

BAND A OR BODY*		BAND B OR END*		BAND C OR DOT OR BAND*		BAND D OR END*	
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR	MULTIPLIER	COLOR	RESISTANCE TOLERANCE (PERCENT)
BLACK	0	BLACK	0	BLACK	1	BODY	±20
BROWN	1	BROWN	1	BROWN	10	SILVER	±10
RED	2	RED	2	RED	100	GOLD	±5
ORANGE	3	ORANGE	3	ORANGE	1,000		
YELLOW	4	YELLOW	4	YELLOW	10,000		
GREEN	5	GREEN	5	GREEN	100,000		
BLUE	6	BLUE	6	BLUE	1,000,000		
PURPLE (VIOLET)	7	PURPLE (VIOLET)	7				
GRAY	8	GRAY	8	GOLD	0.1		
WHITE	9	WHITE	9	SILVER	0.01		

*FOR WIRE-WOUND-TYPE RESISTORS, BAND A SHALL BE DOUBLE-WIDTH. WHEN BODY COLOR IS THE SAME AS THE DOT (OR BAND) OR END COLOR, THE COLORS ARE DIFFERENTIATED BY SHADE, GLOSS, OR OTHER MEANS.

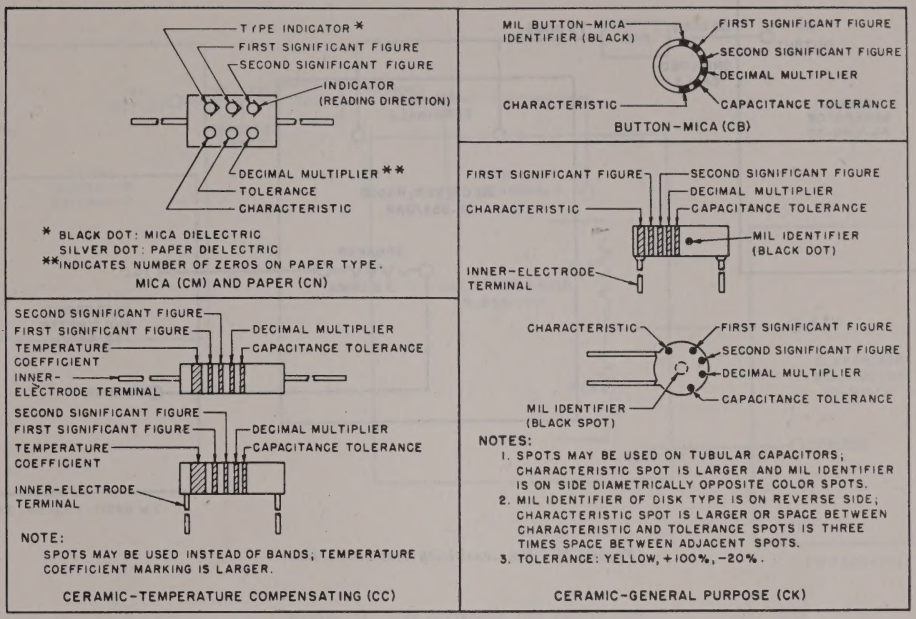
EXAMPLES (BAND MARKING):
10 OHMS ±20 PERCENT: BROWN BAND A; BLACK BAND B; BLACK BAND C; NO BAND D.
4.7 OHMS ±5 PERCENT: YELLOW BAND A; PURPLE BAND B; GOLD BAND C; GOLD BAND D.

EXAMPLES (BODY MARKING):
10 OHMS ±20 PERCENT: BROWN BODY; BLACK END; BLACK DOT OR BAND; BODY COLOR ON TOLERANCE END.
3,000 OHMS ±10 PERCENT: ORANGE BODY; BLACK END; RED DOT OR BAND; SILVER END.

STD-RI

Figure 8. MIL-STD resistor color code marking.

CAPACITOR COLOR CODE MARKING
(MIL-STD CAPACITORS)



CAPACITOR COLOR CODE

COLOR	SIG FIG.	MULTIPLIER		CHARACTERISTIC[1]				TOLERANCE [2]					TEMPERATURE COEFFICIENT (UUF/UF/°C)
		DECIMAL	NUMBER OF ZEROS	CM	CN	CB	CK	CM	CN	CB	CC		
											OVER 10UUF	10UUF OR LESS	CC
BLACK	0	1	NONE		A			20	20	20	20	2	ZERO
BROWN	1	10	1	B	E	B	W				1		-30
RED	2	100	2	C	H		X	2		2	2		-80
ORANGE	3	1,000	3	D	J	D			30				-150
YELLOW	4	10,000	4	E	P								-220
GREEN	5		5	F	R						5	0.5	-330
BLUE	6		6		S								-470
PURPLE (VIOLET)	7		7		T	W							-750
GRAY	8		8			X						0.25	+30
WHITE	9		9								10	1	-330(±500) [3]
GOLD		0.1						5		5			+100
SILVER		0.01						10	10	10			

1. LETTERS ARE IN TYPE DESIGNATIONS GIVEN IN MIL-C SPECIFICATIONS.
2. IN PERCENT, EXCEPT IN UUF FOR CC-TYPE CAPACITORS OF 10 UUF OR LESS.
3. INTENDED FOR USE IN CIRCUITS NOT REQUIRING COMPENSATION.

STD-CI

Figure 9. MIL-STD capacitor color code marking.

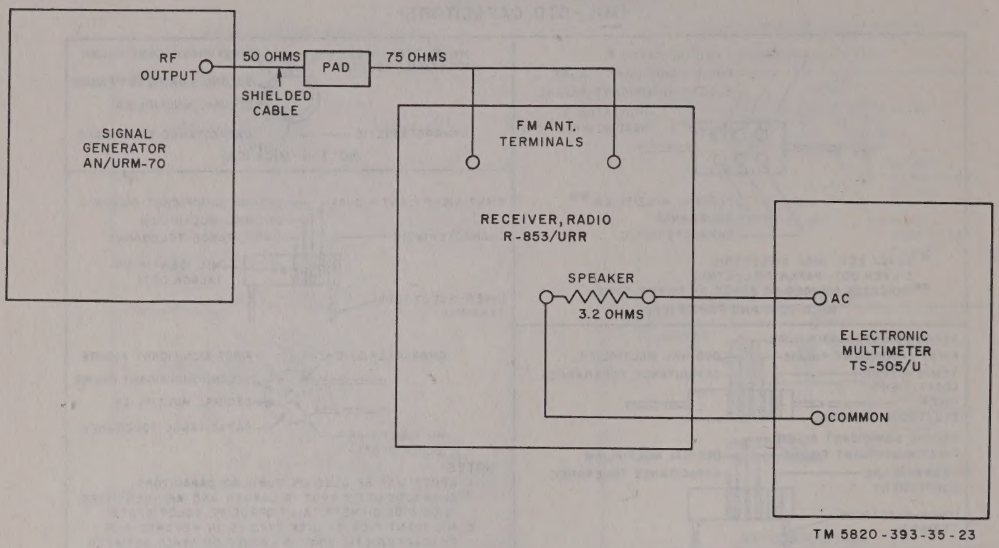


Figure 10. Fm sensitivity test connections.

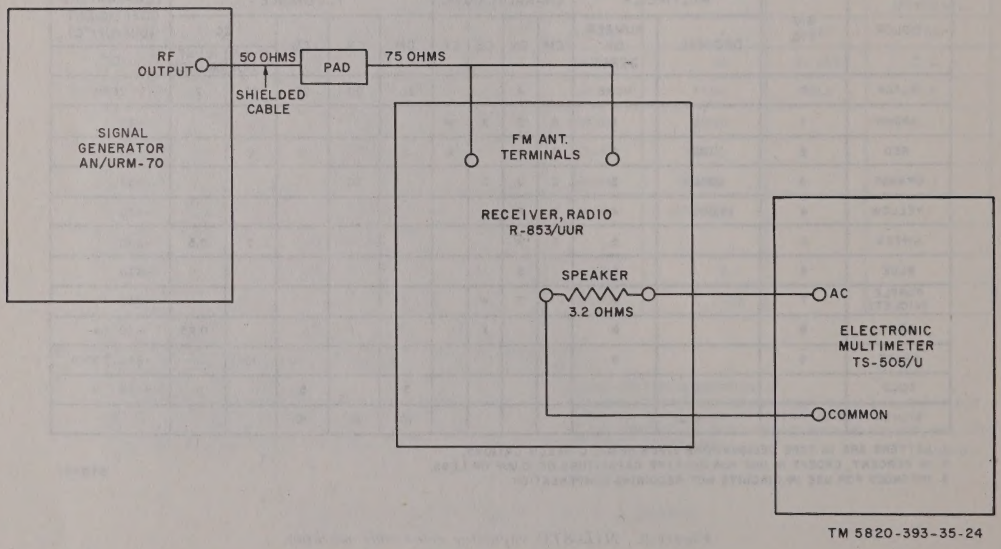


Figure 11. Signal-to-noise ratio test connections.

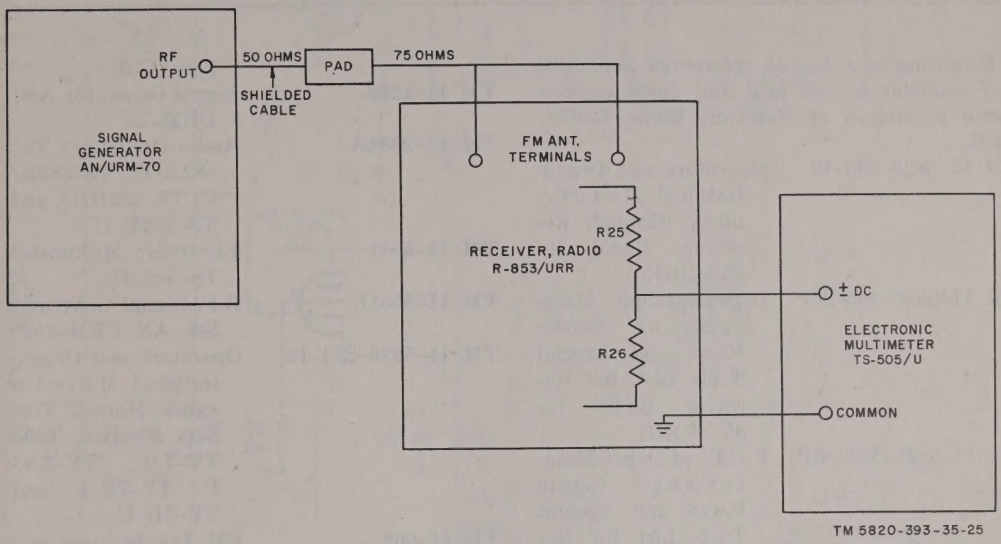


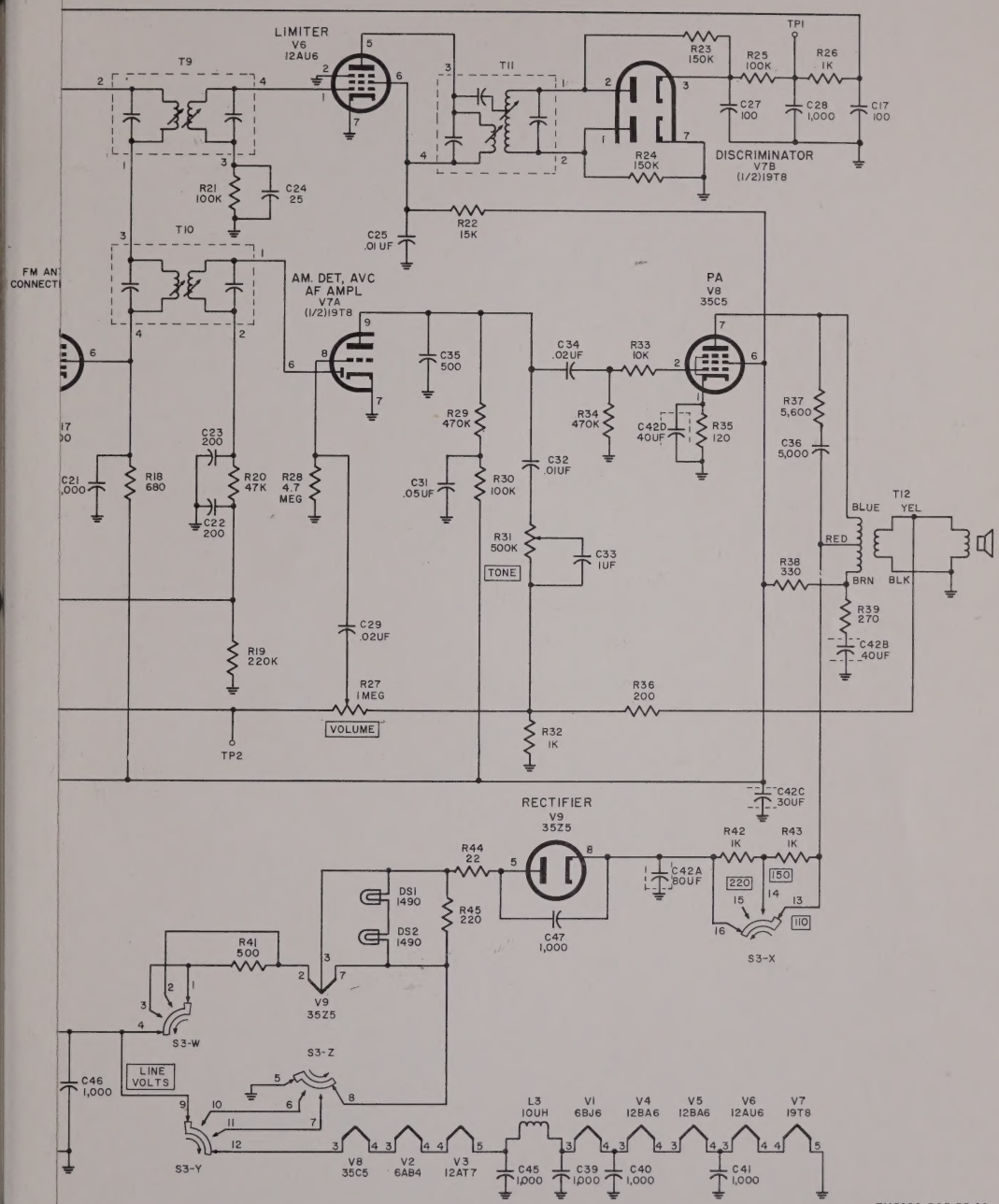
Figure 12. Afc correction test connections.

APPENDIX

REFERENCES

Following is a list of references applicable and available to the field and depot maintenance repairmen of Receiver, Radio R–853/URR.

TM 11–5820–393–12	Operators and Organizational Maintenance Manual, Receiver, Radio R–853/URR.
TM 11–5820–393–20P	Organizational Maintenance Repair Parts and Special Tools List for Receiver Radio R–853/URR.
TM 11–5820–393–35P	Field and Depot Maintenance Repair Parts and Special Tools List for Receiver, Radio R–853/URR.
TM 11–1258	Signal Generator AN/URM–70.
TM 11–2684A	Audio Oscillators TS–382A/U, TS–382B/U, TS–382D/U, and TS–382E/U.
TM 11–5511	Electronic Multimeter TS–505/U.
TM 11–5551E	R.F. Signal Generator Set AN/URM–25F.
TM 11–6625–274–12	Operators and Organizational Maintenance Manual Test Sets Electron Tube TV–7/U, TV–7A/U, TV–7B/U and TV–7D/U.
TM 11–668	FM Transmitters and Receivers.


LIMITER
V6
12AU6
T9
T11
TP1
R23
150K
R25
100K
R26
1K
C27
100
C28
1,000
C17
100
DISCRIMINATOR
V7B
(1/2)19T8
R24
150K
R21
100K
C24
25
T10
C25
.01 UF
R22
15K
FM ANT
CONNECT
AM. DET, AVC
AF AMPL
V7A
(1/2)19T8
PA
V8
35C5
C35
500
C34
.02UF
R33
10K
R37
5,600
C36
5,000
R29
470K
R34
470K
C42D
40UF
R35
120
C23
200
C22
200
R20
47K
R28
4.7
MEG
C31
.05UF
R30
100K
C32
.01UF
R31
500K
TONE
C33
1UF
R18
680
C21
,000
T12
BLUE
YEL
RED
BRN
BLK
R38
330
R39
270
C42B
40UF
C29
.02UF
R19
220K
R27
1MEG
VOLUME
TP2
R36
200
R32
1K
C42C
30UF
RECTIFIER
V9
35Z5
R44
22
C42A
80UF
R42
1K
R43
1K
150
220
110
S3-X
DS1
1490
DS2
1490
R45
220
C47
1,000
R41
500
S3-W
S3-Z
LINE
VOLTS
C46
1,000
L3
10UH
V1
6BJ6
V4
12BA6
V5
12BA6
V6
12AU6
V7
19T8
V8
35C5
V2
6AB4
V3
12AT7
C45
1,000
C39
1,000
C40
1,000
C41
1,000
TM5820-393-35-22

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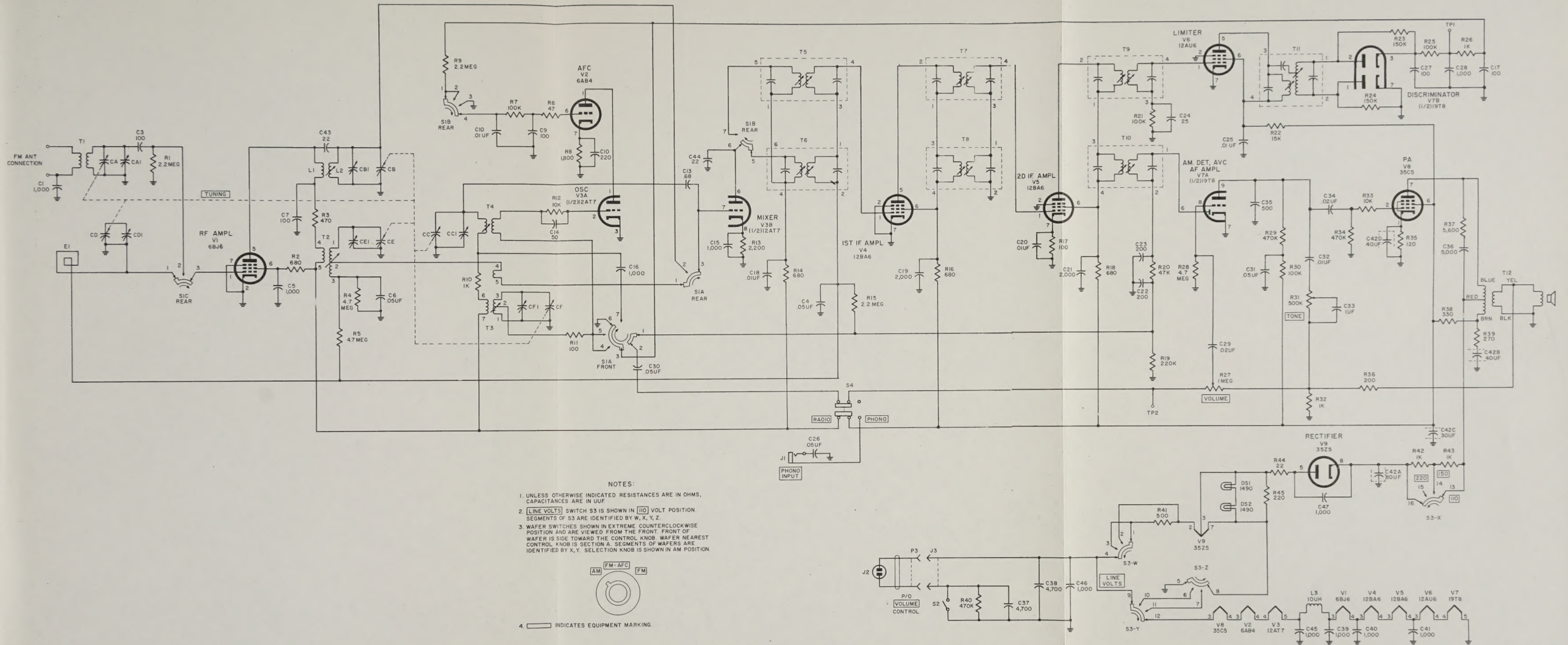


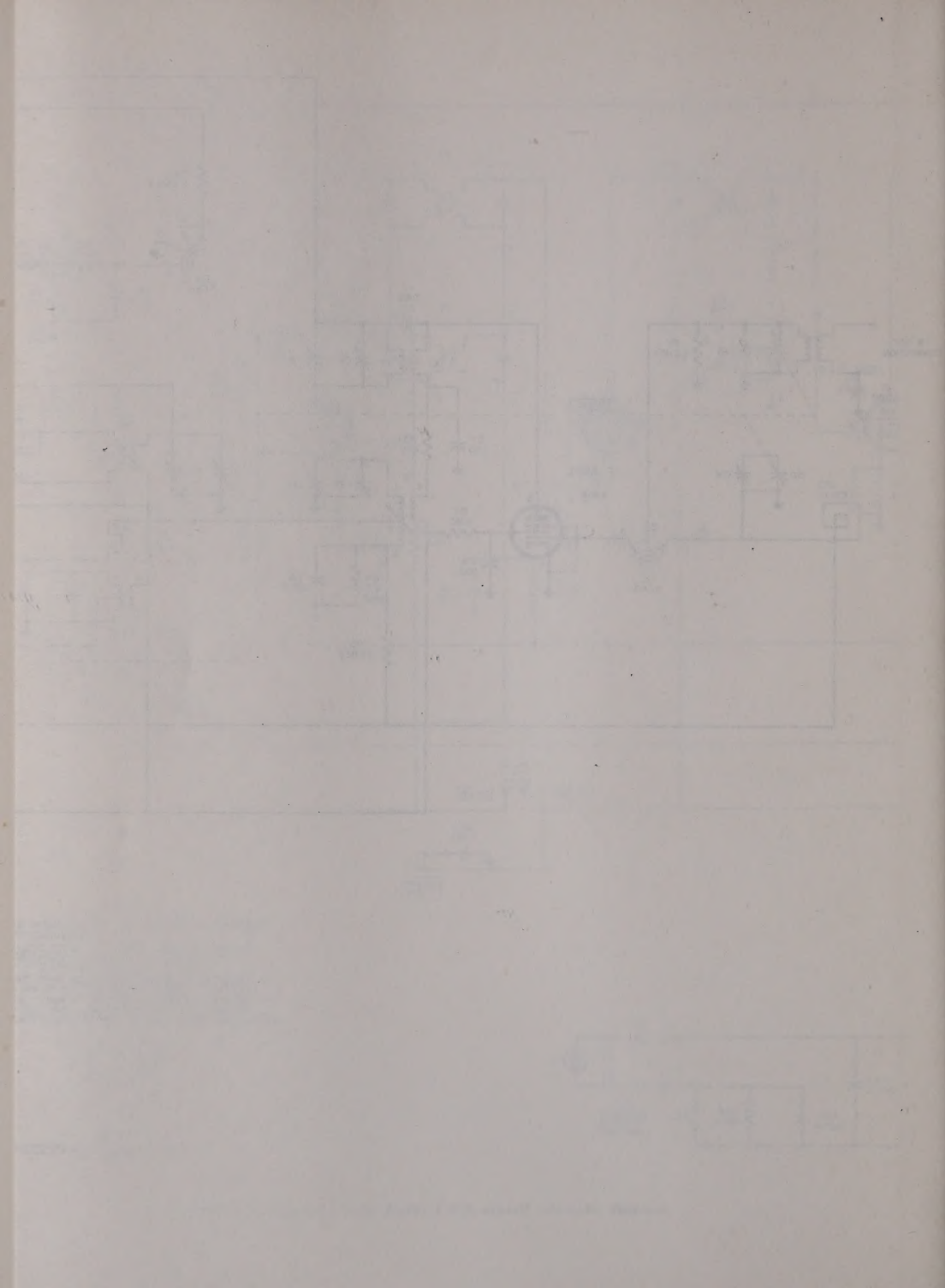
NOTES:

1. UNLESS OTHERWISE INDICATED RESISTANCES ARE IN OHMS, CAPACITANCES ARE IN UUF.
2. [LINE VOLTS] SWITCH S3 IS SHOWN IN [110] VOLT POSITION. SEGMENTS OF S3 ARE IDENTIFIED BY W, X, Y, Z.
3. WAFER SWITCHES SHOWN IN EXTREME COUNTERCLOCKWISE POSITION AND ARE VIEWED FROM THE FRONT. FRONT OF WAFER IS SIDE TOWARD THE CONTROL KNOB. WAFER NEAREST CONTROL KNOB IS SECTION A. SEGMENTS OF WAFERS ARE IDENTIFIED BY X, Y. SELECTION KNOB IS SHOWN IN AM POSITION.

4. ▭ INDICATES EQUIPMENT MARKING.

TM5820-393-35-22

Figure 13. Receiver, Radio R–853/URR, overall schematic diagram.



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NG: State AG (3) Units same as Active Army except allowance is one copy to each unit.

USAR: None.

For explanation of abbreviations used, see AR 320-50.